## Petreco Issues Revised "Manual on Salts in Petroleum"

The Petroleum Rectifying Company announces the publication of the "Petreco Manual on Salts in Petroleum." This manual, a revision of a booklet published some years ago, then entitled "Determination of Salts in Crude Oils," has been prepared for complimentary distribution to the members of the industry in response to many requests,—the supply of the original publication having long been exhausted.

Based on extensive analytical work in the Petreco laboratories, the Petreco Manual describes in detail the best methods of analysis for salts and other impurities in petroleum. Also included is a fund of general information on impurities in crude oils and the character of the problems involved in their determination.

The booklet was compiled by the Petreco research staff, under the supervision of Dr. R. W. Stenzel, Director of Research. Copies of the booklet are available to interested members of the industry on request.

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**Lloyd Well No. 19, Ventura Avenue Field, being drilled by the Drilling and Exploration Company, Inc. Pictured above are: B. H. Bruce, Driller; Sam Kelly, Cathead Man; Red Nugent, Lead Tongman; Clyde Akin, Backup Man.**

*Photo courtesy Wilson Oil Tool Co. Inc.*


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# The Investment Value of Injection Gas

M. L. ARNOLD
Richfield Oil Corporation

**April Meeting**

The old adage "Bury your money deep in the ground and you'll get no interest when the first rolls around" doesn't apply if your money is represented by gas owned or purchased and the burial is effected by injecting the gas into an oil producing reservoir. This opinion, that substantial increases in both the recovery of oil and net profits can be obtained by the use of injection gas in primary pressure control and secondary recovery operation, seems to be so generally accepted among petroleum engineers that it is difficult for one who has spent most of his life on the gasoline plant side of the fence to understand why gas injection is not more generally practiced.

In certain instances, conditions within the reservoir itself may make gas injection uneconomical. In other instances, inability to obtain the cooperation of all or a sufficient majority of the operators may preclude such a program.

Perhaps, we in the natural gas and gasoline industry are at fault. Perhaps, we have not given gas injection program our enthusiastic support because it means foregoing for a comparatively long period of time the revenue enjoyed from the sale of residue dry gas.

While this paper contains data which is believed to be of general interest, it is directed particularly to the men in the natural gas and gasoline divisions of the petroleum industry in the hope that it may arouse their more active interest in gas injection projects. For this reason, the discussion will be developed as follows: First, a brief statement of the necessity for and the objectives of gas injection; second, a discussion of the results of an economic analysis of a hypothetical project, by methods which are applicable to any type of injection project; third, a discussion of methods for making greater quantities of gas available for injection. Some of these methods, if found to be economically feasible and placed in operation, would greatly enhance the prestige of the natural gasoline divisions within the petroleum industry.

For a statement of the necessity, objectives and results to be expected of gas injection, I am going to quote directly from an article[1] co-authored by a man whose opinions are highly respected both by natural gasoline men and by production men. He is Mr. E. O. Bennett, formerly Chief Petroleum Engineer of the Continental Oil Co., now a private consultant, and a recognized authority on this subject. The quotation is as follows:

### Pressure Maintenance

"Oil can be produced only when some form of energy causes it to be moved into a well bore by a differential pressure between the producing zone and the bore. The well may be considered as a vertical pipe line to conduct oil from the point at which it enters the bore to the surface.

"Without energy in some form to move oil into well, the largest deposit would be valueless. Energy for lifting purposes is readily available, but it is extremely difficult to place it in the formation at remote distances from wells. The principal forms of energy associated with oil are gas and water. The gas may be in solution in the oil under formation pressures or in a gas cap immediately over the oil, or both. The water is either directly under the oil or at the edge of the structure flank. Water has no energy within itself to move oil unless it is under a hydrostatic head.

"A cubic foot of gas under pressure contains energy; this energy, properly utilized, can do useful work. The amount of energy in a cubic foot of gas in a producing formation is determined by the pressure at which it is compressed. This applies to both free gas and gas in solution. The useful work done by the energy in the gas is controlled by the manner in which it is used.

### Repressuring

"It has been definitely proved that supposedly depleted pools have been made to produce large volumes of oil by the addition of energy in the form of gas under pressure, a process ordinarily designated as "repressuring." This process has made possible the obtaining of many additional millions of barrels of oil. Oil

ESTIMATED RESERVOIR PRESSURE DECLINE
FOR VARIOUS DEGREES OF PRESSURE MAINTENANCE

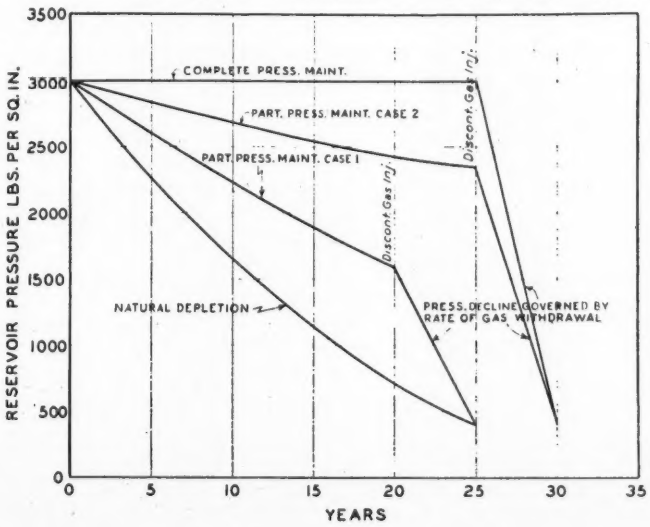
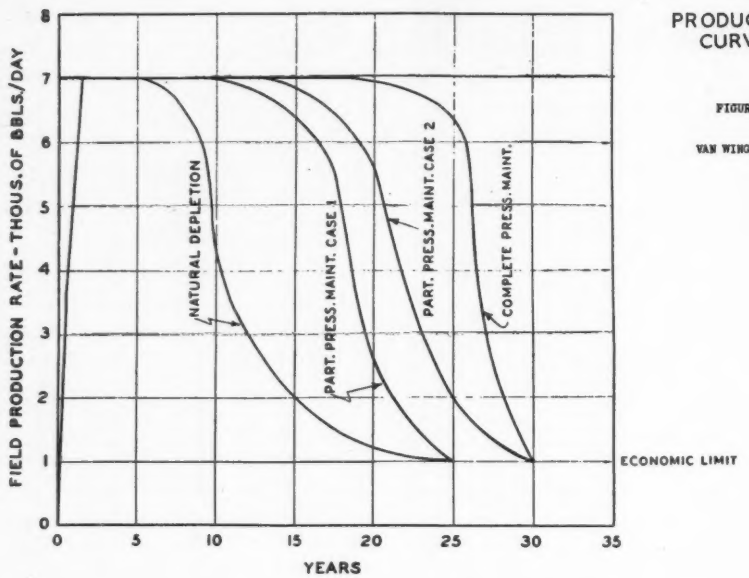



FIGURE 1

VAN WINGEN (4)




PRODUCTION CURVES

FIGURE 2

VAN WINGEN (4)

that is removed under a "repressuring" program has generally lost a large percentage of gas that was in solution at the initial formation pressure. Oil that has gas taken out of solution has its viscosity materially increased, and more energy is required to move it through a given distance in any particular formation. For these reasons oil under "repressuring" requires more energy for production than that produced under flush conditions.

### Pressure Maintenance

"If the original reservoir-pressure conditions could be maintained at all times the greatest maximum ultimate recovery would be obtained because the oil would be less viscous, and the largest possible amount of energy would be available to create maximum differential of pressures between the formation and the well bore for moving oil through the formation. Initial conditions of pressure and energy cannot be maintained without the injection of all gas produced, plus enough additional gas to occupy the space originally containing the liquid volume of oil withdrawn.

"It is not always feasible or economical to return this extra volume required; but it is generally practical and economical to return the gas produced with the oil at the early life of the field, even though the pressure required is great. Early injection of gas into a producing pool is called "pressure maintenance".

"The gas volume and rate of pressure decline in a pool under pressure maintenance is kept more nearly in balance with the rate of oil production. At such time as the pressure slowly declines to a value that oil can no longer be produced, it is estimated that volumes up to 60 percent or more of the total oil in the reservoir pore space will be recovered. This is much more than can be expected under production methods generally carried on in the petroleum industry."

The foregoing quotation is from an article published in 1937 describing Continental's installation for producing the Tepetate Field under primary pressure control. The installation had undoubtedly been made because Mr. Bennett, and the Continental Oil Co., believed that he could predict the recoveries of oil which could be obtained from a reservoir by various production processes. Based upon such an estimate and the associated lifting costs, production under primary pressure control with injection gas must have looked profitable. But, we wonder, can anyone estimate reservoir performance sufficiently close to enable such decisions to be made?

To obtain the answer to this question, and to some others, suppose we carry on an imaginary conversation with Mr. Bennett. "Mr. Bennett", we say, "I have just looked over those statements you made in 1937, regarding Tepetate, and a statement from another article[2] indicating that recoveries from deep, high-pressure zones may be increased from 40 to 100 per cent by the installation of pressure maintenance operations. Now that you have had several years experience at Tepetate, don't you concede that you were considerably off the beam when you made those remarks?"

We find Mr. Bennett's reply in another article [3] which he co-authored "Tepetate Six Years Later" published in 1943. It is as follows:

"The Tepetate field has been producing for over 7 years, and pressure-maintenance operations have been conducted for over 6 years of this time. The oil recovery to date is greater than the estimated ultimate recovery would have been had the field been produced in the conventional manner. The estimated recovery from this pool by ordinary means of production was 11,000,000 bbls. Production to date is nearly 12,000,000 bbls. All oil subsequently recovered to the economic depletion of the pool will be obtained on account of the continuous return of gas to the producing formation. The ultimate recovery, under the plan instituted, is expected to be as much as 150 to 175 percent of the ultimate that would have been produced by normal recovery methods."

"Well", we say, "that seems to be quite conclusive evidence that your estimates were good. I am sorry that I questioned your ability to make such forecasts. But how about lifting costs? That large compressor installation looks expensive. And think of the number of men required to operate and maintain it. Wouldn't it have been more economical to have forgotten the increased recovery and produced the normal amount by conventional production processes?"

Mr. Bennett replies from the same article:

"The saving of pumping equipment otherwise required and the reduced lifting cost for the oil produced up to the present time have been more than sufficient to pay for the entire installation of all necessary equipment for compressing and returning gas to the producing formation."

"OK, Mr. Bennett", we say, "I know when I am whipped. I am convinced that competent petroleum engineers can forecast reservoir performance and lifting costs for various production processes and that upon the basis of these estimates a decision can be made as to the most profitable process for a particular reservoir. How about showing me what such an economic analysis would look like. I would like to see what I could learn from one."

Mr. Bennett's reply to this is purely conjectural, but it might be as follows: "Well son, I don't happen to have one handy, but a couple of years ago a very capable petroleum engineer, named van Wingen, made such an analysis based upon published reservoir data and presented it at an A.I.M.E. meeting[4]. Why don't you look that up?"

To anyone interested in the economics of gas injection, no better advice could be given. But in considering Mr. van Wingen's paper, it is important to keep this thought in mind: The method of analysis proposed is applicable to any injection project, the figures apply to one hypothetical project, and to that project only to the extent that his basic assumptions hold true.

He has compiled financial and operating statistics for four possible means of producing the hypothetical reservoir. These consist of production by natural depletion and by three cases involving gas injection. In the first of these, 50 percent of the solution gas produced is returned to the reservoir. The remainder is either sold or used as fuel. In the second case, all available solution gas is returned to the reservoir. Gas in an amount equal to 48.5 percent of this is purchased and also injected. In the third case, all available solution gas, plus purchased gas in an amount equal to 102 percent of the available solution gas, is injected.

The behavior of the reservoir during production by these four means is shown in figure 1 and the production rate forecast for the various means are shown in figure 2, both reproduced from van Wingen. Certain of van Wingen's data is shown in Table 1, and other data computed from this is shown in Table 2.

TABLE 1. - ANALYSIS OF DATA FOR VARIOUS METHODS OF EXPLOITATION

| Item | Method of Exploitation | | | |
|---|---|---|---|---|
| | Natural Depletion | Pressure Maintenance | | |
| | | Partial | | Complete |
| | | Case 1 | Case 2 | |
| Net profit after all costs & royalties (millions) | $ 25.751 | $ 40.664 | $ 49.938 | $ 59.373 |
| Net profit after all costs & royalties discounted for present worth @ 6 percent (millions) | $ 14.651 | $ 20.312 | $ 22.296 | $ 24.078 |
| Oil Reserves, Bbl. (Millions) | 33.0 | 48.6 | 57.6 | 67.8 |
| Gas Reserves M Cu. Ft. (millions) | 62.141 | 66.770 | 69.470 | 72.500 |
| Oil recovery factor, percent | 25.6 | 37.7 | 44.7 | 52.6 |
| Total injected gas M Cu. Ft. (millions) | | 20.060 | 43.665 | 81.265 |
| Gas Purchases M Cu. Ft. (millions) | | | 16.865 | 44.332 |

TABLE 2. - COMPARISON OF DATA FOR VARIOUS METHODS OF EXPLOITATION

| Item | Method of Exploitation | | | |
|---|---|---|---|---|
| | Natural Depletion | Pressure Maintenance | | |
| | | Partial | | Complete |
| | | Case 1 | Case 2 | |
| Average daily gas processed - Mcf | 6805 | 9509 | 10325 | 14033 |
| Average daily gasoline production - Gallons | 6805 | 9509 | 10325 | 14033 |
| Average daily injection rate - Mcf | | 2746 | 4782 | 8900 |
| Average daily gas purchases - Mcf | | | 1737 | 4855 |
| Increase in oil recovery over recovery by natural depletion | | | | |
| Bbl. (Millions) | | 15.6 | 24.6 | 34.8 |
| Percent | | 47.3 | 74.6 | 105.5 |
| Total production costs - cents per Bbl. of oil recovered | 28.8 | 22.8 | 21.2 | 22.4 |
| Mcf gas injected per Bbl. of oil recovered over recovery by natural depletion | | 1.28 | 1.78 | 2.34 |

Certain of van Wingen's basic assumptions for the hypothetical reservoir studied will be of particular interest to gas men. They are as follows:

1. The average gasoline content of the gas will be 1 G.P.M. for all cases considered.

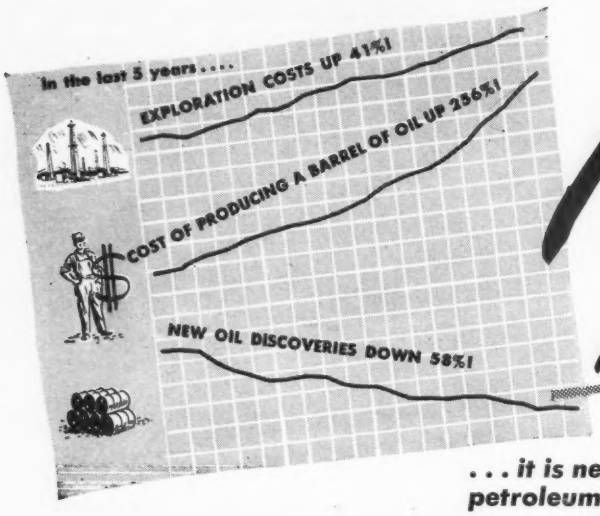
2. The gas injected into the reservoir will be produced after the end of the injection program. It will have become enriched by contact with reservoir fluids and will also have a gasoline content of 1 G.P.M. and, therefore, require processing.

3. Total fuel plus plant shrinkage will be equal to 15 percent of the wet gas processed.

4. Both purchases and sales will be at 7 cent per Mcf.

With these assumptions in mind, and remembering that the figures are for a particular case only, let us look at Table 1.

The figures in the first two lines of columns 1 and 2 indicate conclusively the profit to be gained by injecting a portion of the solution gas. Columns 3 and 4 also indicate that the injection of purchased gas is profitable, but the profits will be less than those shown if it is necessary to pay more than 7 cents per Mcf for the gas. It is interesting to note that pressure maintenance increases gas recovery as well as oil

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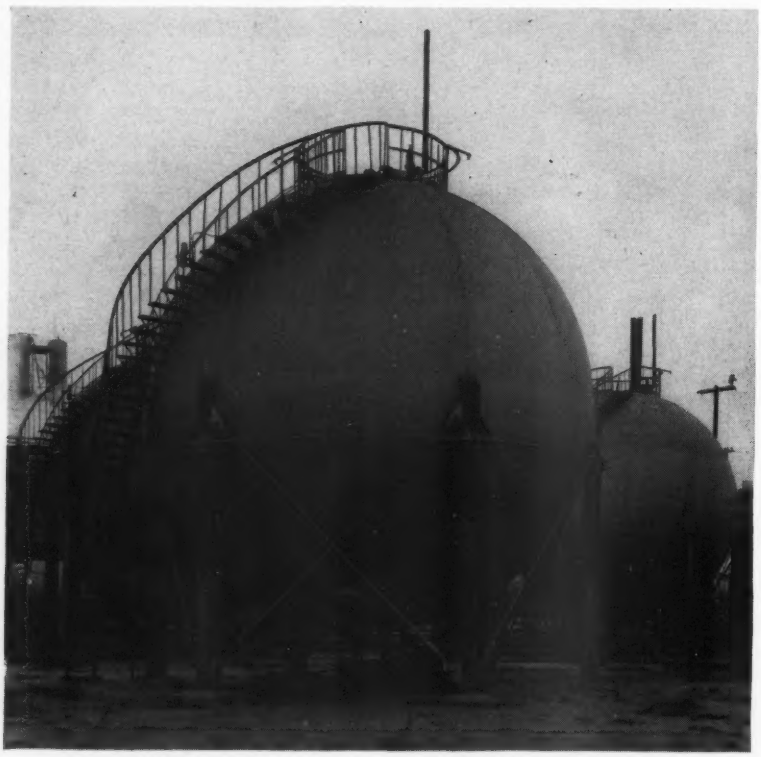

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recovery. For the case of complete pressure maintenance, the increase amounts to 23.3 percent of the gas purchase.

Table 2 presents the data of Table 1 on a unit basis for those of us who have not yet become accustomed to thinking in terms of billions. Your attention is directed to the last item in particular, the Mcf of injection gas required per barrel of oil increase over recovery by natural depletion. Think of it the next time you look at your gas sales.

We have reviewed the opinions of two capable petroleum engineers on the subject of production. You will note that both van Wingen and Bennett are in substantial agreement concerning the maximum ultimate recovery factor possible with pressure maintenance and the relative increase in production over that to be expected with production by natural depletion. The testimony of other experts also support this view.

It is also indicated by the last item of Table 2 that it might be possible to pay more for the purchased gas and still not exceed the production cost per barrel by natural depletion.

The existence of such opportunities for profit and increased recovery is a challenge to the petroleum industry to reach agreements which will make production under pressure control possible, and to make available the injection gas required.

Direct purchases from gas companies or producers of dry natural gas is the most obvious possibility, if such purchases can be made economically. In this field, though, the oil producer must compete with the domestic and industrial consumer of natural gas. Some gas companies might be interested in working out long-term agreements for the storage of surplus gas. The development of dry natural gas reserves for use in injection projects is sometimes possible.

A considerable amount of gas can be made available by using it more efficiently in development and production operations. Internal combustion engines consume far less gas per horsepower hour than the conventional oil field power plant composed of boilers and steam engines. On the average it will be from 80 to 90 percent less.

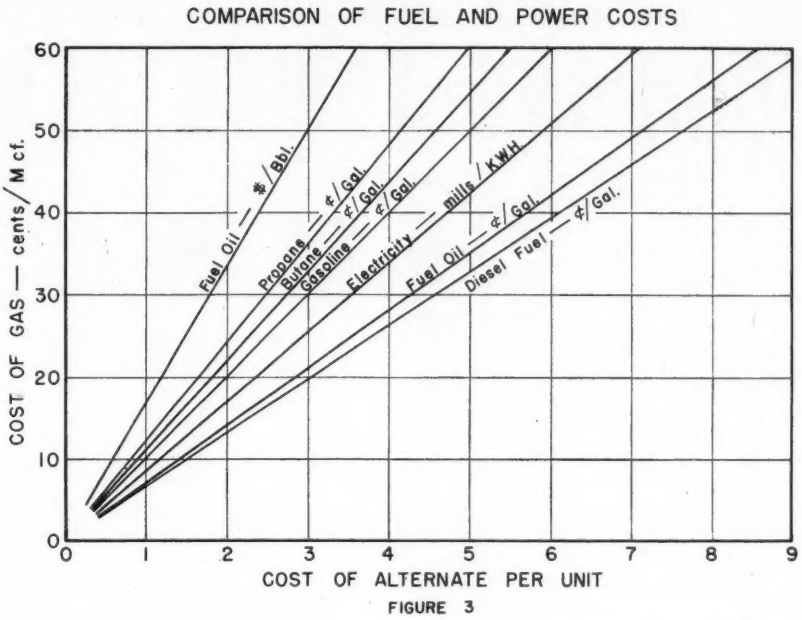

FIGURE 3

Of course, if diesel power is substituted, the saving is 100 percent. Or fuel oil could be substituted for gas. The lease agreement might permit the operation of a small plant for the production of royalty-free diesel or fuel oil for development and production work. And speaking of that, aren't there refinery operations which produce gas as a by-product? Perhaps we could get our refinery department to conduct certain cracking operations in the field. Speaking of cracking, didn't the gas companies at one time crack natural gas and obtain an increase in volume? Perhaps, that might be practical. And what about the manufacture of chemicals from natural gas and petroleum? Do any of those processes produce by-product gases suitable for injection?

An amazingly large number of sources suggest themselves. The question of determining which sources have economic possibilities depends upon the value which can be assigned to the gas as an injection medium and the magnitude and expected life of the particular project. If the gas comes from a manufacturing operation, the value of associated products must be considered. In addition, the physical and chemical properties of the manufactured gas must be considered.

It is of primary importance that the gas be harmless to the reservoir and to the production facilities. Its specific volume at reservoir pressure and temperature should be high. Unless the oil in the reservoir is high in viscosity, the gas should be relatively insoluble in the reservoir liquid phase, since free gas occupies a far greater volume than gas in solution. Moreover, some reservoir liquids, when diluted, precipitate asphalt-like substances which tend to impede the flow of fluid and reduce recovery. The presence of constituents in the gas not native to the reservoir may be advantageous since it would permit the detection of injection gas in well effluent in case of by-passing. A further important consideration is that the gas remaining in the reservoir be suitable for use as fuel if it is to be sold at the end of the operation.

In secondary recovery operations, air is sometimes used as an injection gas but even at the low pressures required for this work difficulty is experienced with oxidation. The use of combustion products from internal combustion engines has been suggested[10] as a means of eliminating oxidation trouble. The controlled combustion of natural gas-air mixtures over a catalyst has also been suggested[11] as a means of preparing a suitable gas. In this latter method the heating value of the resultant gas is maintained at a proper value if the product is to be ulti-

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mately used as fuel. It is possible that such a process might be applicable to the production of gas for pressure maintenance purposes.

The reactions of methane or ethane with steam also produce large volumes of gas which would be suitable for injection.

It would appear that processes which give increased volumes of gas together with a valuable by-product would have the greatest economic possibilities. This does not necessarily mean that the hydrocarbon processed must be a gas, however. It would also appear that the processes, with the exception of those previously mentioned, would be limited to those in which the hydrocarbon is subjected to thermal cracking.

When hydrocarbons are subjected to thermal cracking, or pyrolysis, the lower molecular weight hydrocarbons may be formed, or the hydrocarbon molecule may be completely reduced to carbon and hydrogen. In this latter case one mol of hydrocarbon of the general formula $C_nH_{2n}+_2$ will yield (n+1) mols of hydrogen. In terms of volume, if the hydrocarbon is a gas, this means that one standard cubic foot of gas of formula $C_nH_{2n}+_2$ will yield (n+1) standard cubic feet of hydrogen.

The volumetric behavior of a particular gaseous component in a high-pressure reservoir cannot be predicted without an accurate quantitative knowledge of the other components with which it is to be mixed. But in general it can be stated that equal volumes of hydrogen, methane, ethane, propane and butane, measured at atmospheric conditions, would not occupy equal volumes at reservoir conditions. From data by Sage and Lacey[5] as applied to a typical plant residue dry gas, the volumes occupied by one pound mol of each of the gaseous constituents has been estimated for an assumed reservoir condition of 190° F. and 3000 psi abs. One pound mol is that quantity of a gas which exactly occupies a volume of 379.5 standard cubic feet. The volume given here for hydrogen was estimated from a compressibility factor chart using the pseudo critical constant suggested by Newton[6].

| Estimated Partial Molal Volume of Various Gases in the Reservoir in Cubic Feet at 190° F. and 3000 psi Abs. | |
|---|---|
| Hydrogen | 2.62 |
| Methane | 2.16 |
| Ethane | 1.01 |
| Propane | 1.00 |
| Butane | 0.26 |

On the basis of the above data, the volume occupied in the reservoir by one pound mol of the various hydrocarbons can be compared with the volume which would be occupied by the hydrogen obtained by completely decomposing the hydrocarbon to hydrogen and carbon.

| Constituent | Volume of Constituent | Volume of Released Hydrogen |
|---|---|---|
| Methane | 2.16 | 5.24 |
| Ethane | 1.01 | 7.86 |
| Propane | 1.00 | 10.48 |
| Butane | 0.26 | 13.10 |

Another property to be considered in evaluating various gases for injection purposes is their solubility in the reservoir liquid phase. Unless it is desired to lower the viscosity of the liquid phase, greater benefit will be obtained by using a gas of low solubility.

No generally valid comparison can be made of the solubilities of the various gases. However, if the equilibrium constants are compared, a rough idea can be gained of relative solubilities. The constants used in preparing the following table were those of Katz and Hachmuth[12].

| Constituent Relative Solubility Based on Equilibrium Constants at 190° F. and 3000 psi Abs. | |
|---|---|
| Methane | 1.0 |
| Butane | 5.0 |
| Ethane | 2.3 |
| Propane | 3.2 |

No data is available for hydrogen at the same conditions. Kirkbride[13] gives data indicating that at 800 psi the equilibrium constant for hydrogen would be about ¼ that of methane.

Thermal cracking processes in which the hydrocarbon molecule is only partially decomposed also have possibilities. For examples, the pyrolysis of ethane to produce methane and hydrogen, propane to produce ethelyne and methane, and butane to produce propylene and methane. These reactions are shown below in the order of reference. The figures in parenthesis are the estimated partial molal volumes at reservoir conditions.

a) $C_2H_6$ (1.01) ..... $CH_4$ (2.16) + $H_2$ (2.62) + C
b) $C_3H_8$ (1.00) ..... $CH_4$ (2.16) + $C_2H_4$
c) $C_4H_{10}$ (0.26) .... $CH_4$ (2.16) + $C_3H_6$

No partial molal volumes were estimated for ethylene and propylene since they would probably be removed as a valuable product before the gas was injected. Even so, it will be noted that a substantial increase in volume has been obtained.

In a commercial operation involving reactions (b) and (c), products other than those shown would be obtained. Perkins[7] shows the following products and yields from the thermal polymerization of propane, butane and a propane-butane mixture.

| Products Weight Percent | Propane | Butane | 50% Butane 50% Propane |
|---|---|---|---|
| Gasoline | 55.0 | 66.0 | 60.8 |
| Tar | — | 4.3 | 2.3 |
| Dry Gas | 45.0 | 29.7 | 36.9 |
| | 100.0 | 100.0 | 100.0 |

Perkins discussion will be of considerable interest to anyone investigating the economics of this subject.

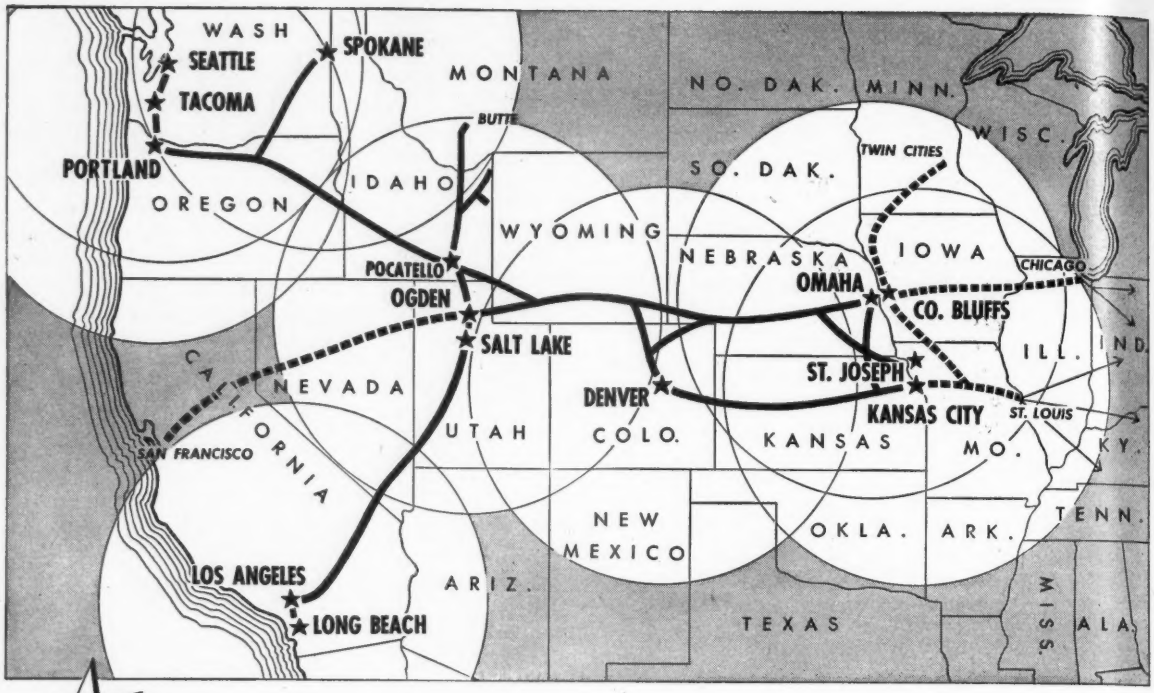
It has also been proposed to use as an injection gas the by-product nitrogen and hydrogen from the generation of oxygen for the Fischer-Tropsch process[8] and a hydrogen-halide containing residue gas from an isomerization process[9].

The principle point to be gained from this discussion of pyrolysis is that it would seem to be entirely possible to remove propane and butane from natural gas, thermally crack the propane and butane, and recover from the process valuable by-products and a volume of gas which will occupy a greater volume in the reservoir than would have been occupied by the propane and butane removed. However, if natural gas is used as fuel for the cracking operation, the effect of this on the gas balance must be considered.

One further word. When considering the substitution of fuel oil or other fuels for natural gas, the cost relationships between the two must be considered. This is shown in Figure 3. The conversion factors used were as follows:

Gasoline .....0.1 Gal./Bhp-Hr.
Butane..Same Thermal Eff. as Nat. Gas
Diesel Fuel .....0.45 Lb./Bhp.-Hr.
Nat. Gas (1100 Btu/Cu. Ft.) .....
10 Cu. Ft./Bhp-Hr.
Propane.....Same Thermal Eff. as Nat. Gas
Fuel Oil .....6 Mcf Nat. Gas/Bbl. Oil
Electrical Power .....88% Efficiency

*(Continued on Page 21)*

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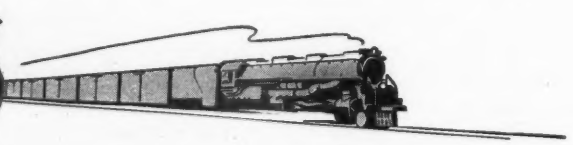

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# Casing Landing Practice


## ABSTRACT

The advancement of casing program design technique is pointed out in contrast to a lack of corresponding improvement in landing practice. It is suggested that individual attention be given to each well in a new field until enough information is available to warrant the adoption of a standard procedure.

Long oil strings and long intermediate protective strings are presented as being the most hazardous and particular attention is directed to the necessity of keeping their landing weight to a minimum consistent with the other factors involved.

Several common landing methods are discussed, showing their weaknesses under certain conditions.

A chart is presented to show a method of determining the depth to the freeze point.

Another chart shows a method of evaluating the effect on the load at the landing head of pressure and temperature changes.

An example procedure is worked out to show the need of engineering consideration of the landing problem.

The conclusion that the landing weight of long strings should be held to a minimum is emphasized by reference to A.P.I. data on biaxial loading which shows a substantial reduction of the resistance of casing to burst and collapse when tensile loads are more than half the yield strength of the pipe.



By
**JOHN P. DeHETRE,**
**Field Engineer**
**The Youngstown Sheet and Tube Company**



Spring Meeting
Pacific Coast District
Division of Production
American Petroleum Institute
Los Angeles, California


## INTRODUCTION

There have been many refinements during the past few years in the methods of casing program design. All of these improvements have been aimed at tapering casing strings so that a greater percentage of the pipe that is set in the hole is subjected to the maximum allowable stress. This is especially true in long strings of casing since there are practically no operators today that use less than three kinds of pipe in casing strings longer than 8000 feet and they may use as many as five or six different weights and grades.

To match this development in casing program design, it is questioned whether there has been a corresponding advancement in landing practice technique. Many old methods that were conceived when wells were only a fraction of their present depths are still being used. However, it would be difficult to make a definite statement that certain ones of these methods are unsatisfactory for particular cases. If more of the failures that have occurred in landed strings of casing could have been retrieved for examination, there is reason to believe that a portion of them could be attributed to an overstressed condition that developed after the pipe was landed.

Although practically all operators now figure their casing programs much closer than they did seven or eight years ago, and they have devoted a considerable amount of engineering thought to program design methods, still a great many of them leave the matter of arriving at a proper landing procedure to the man in the field who, in many cases, does not know the margin of safety that is available in the casing program. He also may not know the pressure and temperature conditions that may be created by future production methods. It is probably true that a standard procedure of landing pipe can be set up for a particular field where conditions are well known, but it is seriously doubted if any one method can be set up that will be entirely satisfactory to an operator who is drilling in many fields where wide ranges of depths, pressures, and temperatures are encountered. It is therefore believed that the discussion to follow will show the desirability of giving adequate engineering consideration to casing landing procedure for individual wells in new fields until enough is known about the area to establish a standard method.

Because the assumptions affecting landing procedure that must be made in drilling the first well in a

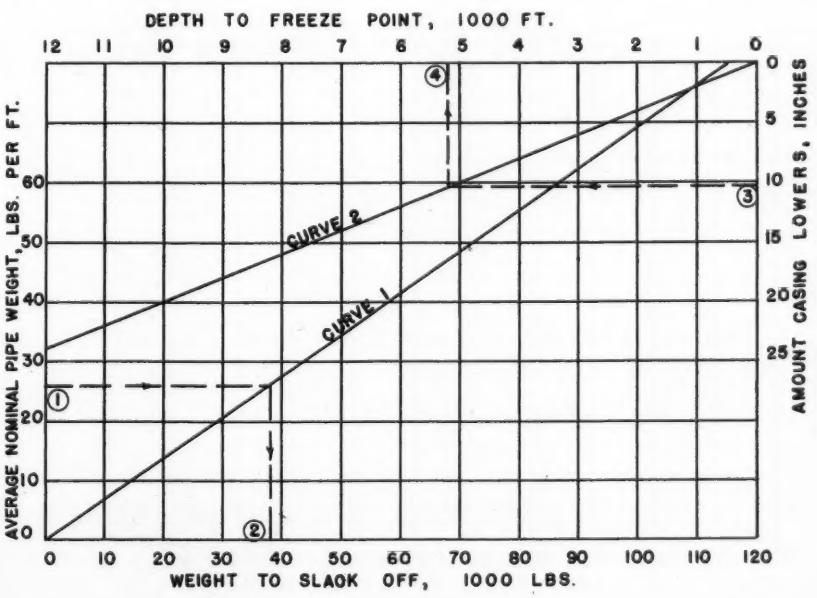
DEPTH TO FREEZE POINT, 1000 FT.
12 11 10 9 8 7 6 5 4 3 2 1 0
AVERAGE NOMINAL PIPE WEIGHT, LBS. PER FT.
0 10 20 30 40 50 60
AMOUNT CASING LOWERS, INCHES
0 5 10 15 20 25
CURVE 2
CURVE 1
1
2
3
4
0 10 20 30 40 50 60 70 80 90 100 110 120
WEIGHT TO SLACK OFF, 1000 LBS.

CHART FOR DETERMINING DEPTH TO FREEZE POINT OF CASING STRINGS.—FIGURE 1

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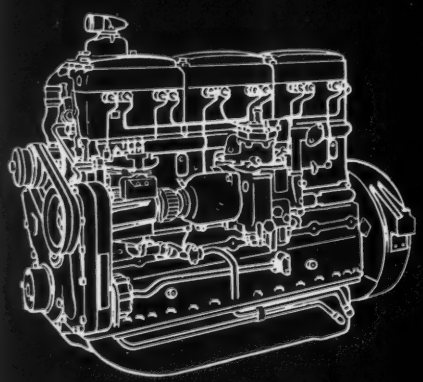

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new area, are subject to such wide variation, it would not be worthwhile to base concise calculations upon them; but as information is developed, more accurate figures can be made to bring the landing stresses to a minimum. The greatest hazards associated with variations in landing methods occur in long oil strings and protective strings where the safety factors are low and pressure and temperature changes are most apt to be severe. It is with these long strings and a method to aid in arriving at a minimum landing weight consistent with safety that the remarks of this paper are most concerned.

## EXISTING LANDING METHODS

Listed below are several representative landing methods that have been used:

(1) The casing is landed at the exact position it occupied while standing cemented.

(2) The casing is landed with a weight which is a certain arbitrarily chosen percentage (a) in excess of or (b) less than the measured weight of the pipe just prior to cementing.

(3) The casing is landed with a certain number of inches (a) stretch or (b) slack per 1000 ft. of casing length, measured from the free hanging position while standing cemented.

In most cases the pipe is allowed to stand cemented for at least six hours and many operators wait 24 hours before landing their casing. Recent work[1] has shown the necessary waiting-on-cement time from a strength standpoint to be approximately 10 hours maximum. This amount of time is also shown to be sufficient for the cement to reach its maximum temperature. There are some operators that land their casing as soon as the cement is put away. They, of course, must land the pipe with its full weight, allowing any subsequent temperature or pressure changes to change the load at the head. The matter of temperature and pressure changes will be discussed at more length later.

One danger associated with method (1) occurs when the pipe is rested on bottom to allow the removal of blowout preventers and other equipment prior to landing. In this case the freeze point may move upward while the casing is in compression, and later when an attempt is made to bring the pipe to its original position for landing, a greater stress is induced in the free casing because a shorter length of pipe is stretched the same total amount. It is possible that excessive tensile stresses can be induced by this method, and the operator should watch his weight indicator carefully to ascertain that he does not pull more than the total weight of the pipe before it was cemented.

Another danger accompanying this method is particularly pronounced in deep gas and condensate wells where bottom hole chokes are used. In this instance an excessive temperature drop may cause a large increase in the tensile loading at the landing head. This load increase caused by a temperature drop added to an already large tensile load of a long casing program can induce stresses of a dangerous magnitude in the upper lengths of pipe.

Each of the other listed methods can also be the cause of trouble under certain conditions, and consequently it is felt that none of these should be used arbitrarily, but they should be varied according to the well. As an example, method (2a) could cause trouble from excessive tensile stress if the over-pull happened to be in excess of the margin of safety for a particular weight and grade of pipe in the string. This is most likely to be the case when a lower grade of casing is used below the top section in the program. This circumstance indicates that the designer of the casing program should always have a hand in the establishment of the landing procedure.

Method (2) might conceivably cause a bottom portion of the free casing to be in compression (too much slack) if the actual freeze point of the pipe were to be established at a deeper than anticipated point prior to landing the pipe. This condition is most apt to be dangerous when long protective strings are set and considerable drilling is done through the casing. In this case the drilling mud from the deeper hole will be hotter than that in the pipe when it was landed, and this increase in temperature will increase the slack.

Method (3a) might induce excessive tensile stresses, especially when the freeze point moves upward, and method (3b) might cause the pipe to be too slack if the freeze point were higher than expected. Consequently, it is not believed to be advisable to use any method involving definite increments of stretch or slack because the resulting stresses then become a function of the depth to freeze point which is an uncertain and changing figure.

## LOCATION OF FREEZE POINT

In all discussions concerning casing landing procedure the location of the freeze point becomes a major factor. This is occasioned by the fact that no one wishes to land casing without all the free pipe in tension. It should be stated that the effect of buoyancy of the drilling mud on the weight of the free pipe should not be considered when the lower end of the casing is constrained as when it is cemented or otherwise anchored in the hole.

If all casing landing methods involving arbitrarily chosen amounts of stretch or slack are eliminated, it becomes obvious that the maximum depth to the freeze point becomes the important consideration. The phrase "Maximum depth to the freeze point" is used because it is generally considered that the depth of the freeze point will eventually move upward to the approximate depth of the shoe of the next larger casing size, and in many fields this change of freeze point is known to take place in a matter of days or even hours after the pipe is landed. Therefore, if the pipe is landed with sufficient tension to assure the operator that the maximum amount of free pipe will be in tension, the stress on the top joint will not change with subsequent upward movement of the freeze point.

J. T. Hayward[2] pointed out that stretch increments of frozen pipe for known amounts of pull can be used to calculate the depth to the freeze point of a frozen string. The convenient chart of Figure 1 has been developed for use in determining the freeze point in the field. This chart

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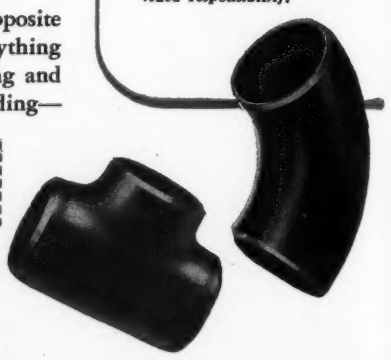

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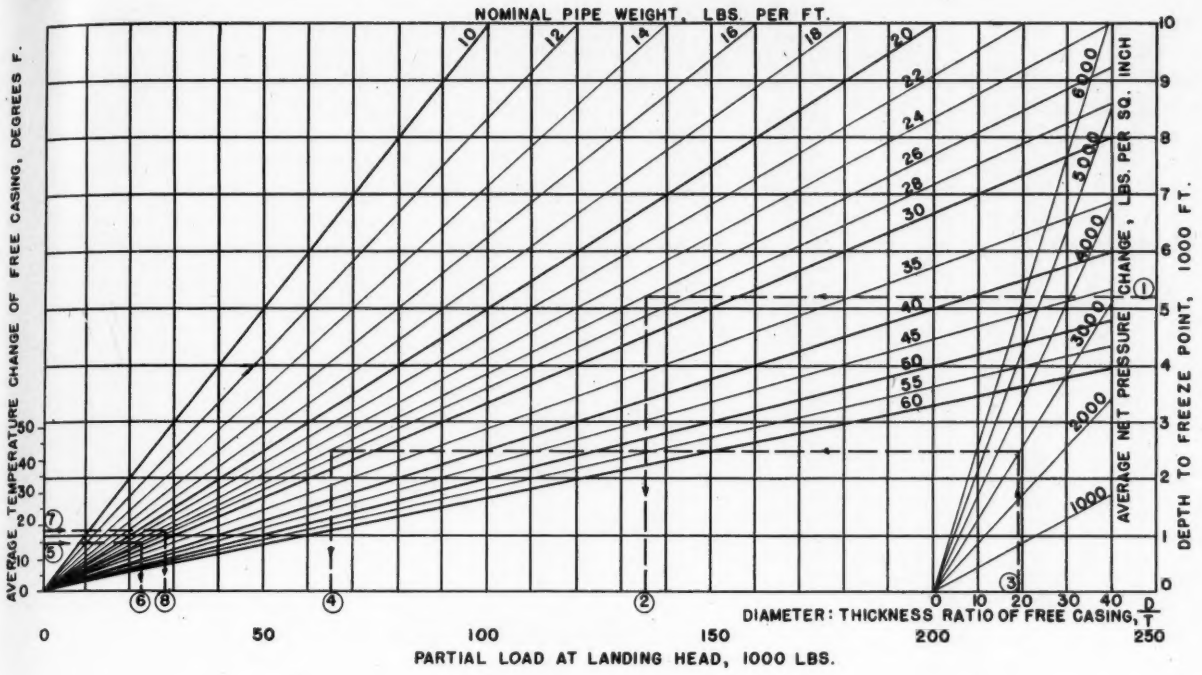


LANDING WEIGHT CHART — FIGURE 2

is based on a stress reduction of 5000 psi in the free pipe. Curve 1 is a graphical solution of the equation.

(1) $P = 1445\ W$

where $P$ = Load, to slack off,[a] pounds

$W$ = Average nominal pipe weight above freeze point, pounds per ft.

Curve 2 is a graphical solution of the equation.

(2) $L = 500\ \Delta\ L$

where $L$ = Depth to freeze point,[a] feet

$\Delta L$ = Amount casing lowers, inches

The application of this chart will be explained in the example later. Because this chart employs a reduction in load its use is recommended particularly for long strings where tensile loads are already high, and any increase in stretch may be dangerous. Since the curves are based on a stress change of 5000 psi, the chart may also be used for added tension if this should be desirable in shorter strings. It should be stated at this point that the success of any method involving weight increments depends almost entirely on the accuracy of the weight indicating equipment, and unless this equipment is accurate within 5 per cent, the results obtained would be of insufficient value to warrant the effort. In the event that the weight indicator is unsatisfactory, the cement point can be determined by a temperature survey checked by cement displacement figures provided the calculator is conservative and establishes his estimate on the deep side so the resulting landing weight will be in excess of the actual weight of free pipe.

Concerned with the matter of change in freeze point is the problem of removing casing from the landing slips when remedial work is necessary on the well. If a 10,000 ft. string of 7 in. casing consisting of 1700 ft. of 29 lb. N-80, on bottom and 8300 ft. of 26 lb. N-80, with long couplings on top is landed with the full pipe weight 225,000 lb., prior to cementing, the tensile stress in the top length of pipe will be approximately 30,000 psi and the safety factor on the pull-out strength of the couplings will be 2.05. These figures are based on the total weight of the casing, taking into account the effect of buoyancy of 72 lb. per cubic foot mud, since the weight prior to cementing would be affected by the buoyancy.

If the freeze point of this casing string should move to a point only 1000 ft. below the landing head and it requires a 1 ft. movement to release the pipe from the landing slips, this movement would then induce an added tensile stress of 30,000 psi. This would cause the total tensile stress in the pipe wall to be 60,000 psi or a safety factor of 1.33 on the minimum yield strength of the pipe wall. Stretching this 1000 ft. of 26 lb., N-80 casing, 1 ft. would require an over-pull of 225,000 lbs. or a total pull of 450,000 lbs. which would result in a safety factor of only 1.02 on the minimum pull-out value of the couplings.

These figures do not consider any average change in temperature or pressure from those at the time of landing, and are pointed out to show that trouble may be encountered when remedial work is attempted, especially if too much tension is applied to the pipe when it is landed.

## EFFECT OF PRESSURE AND TEMPERATURE

Once the pipe is frozen at the bottom and anchored at the top the only important causes of stress changes are temperature changes, pressure changes, and earth movement. If the average temperature

(a) See appendix for derivation.

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and pressure changes to which the free pipe is subjected are considered, the effect on the weight at the landing head is not a function of the length of free pipe.

The stress induced by earth movement when the pipe ends are constrained is dependent upon the distance between anchor points, decreasing with an increase in length of free pipe for a given amount of movement; but it has been the experience of most operators that if an earth movement of importance occurs, it is useless to consider that any casing program will withstand the resulting loads. As a result, the matter of stresses resulting from earth movements will not be dealt with in this paper.

Cases have been noted where pipe has moved upward in the landing slips because of the injection of high temperature gas into the casing. This same upward movement has occurred in wells where high pressure gas was introduced into the annulus outside the casing in question. In each case the elongating effect of temperature and external pressure was sufficient to overcome that created by the tension that was applied when the pipe was landed. Because of these lengthening conditions, added tension must be applied at the landing head to compensate for them when their existence is anticipated.

The chart of Figure 2 has been developed as an aid in evaluating the effect of temperature and pressure changes on the load at the landing head. The section of the chart devoted to temperature change is a graphical solution of the equation.

$$(3)\quad P = 58.2\ W\ \Delta\ T^{(a)}$$

where P = change in load at landing head, pounds
W = Nominal pipe weight, pounds per foot
$\Delta$ T = Average Temperature change of free casing, degrees F.

When the temperature change is a drop, the effect at the landing head is an increased load; and when the temperature change is a rise, the effect is a decreased load.

The section of the chart which has to do with pressure change is a graphical solution of the equation.

$$(4)\quad P = 0.0434\ W\ \Delta\ p\ \frac{D}{t^{(a)}}$$

where P = change in load at landing head, pounds
W = Nominal pipe weight, pounds per foot
$\Delta$ p = Average net pressure change in free pipe, pounds per square inch
D = Pipe O.D. inches
t = Pipe wall thickness, inches.

If the average net pressure change is an external increase, the effect at the landing head is a decreased load, and if the pressure change is an external decrease (internal increase), the effect at the landing head is an increased load.

Figure 2 also provides a graphical method of arriving at the weight of the pipe above the estimated freeze point. This section of the chart is a graphical solution of the simple equation

$$(5)\quad P = W\ L$$

where P = Weight of pipe above freeze point, pounds (Effect of buoyancy neglected)
W = Nominal Pipe Weight, pounds per foot
L = Depth to freeze point, feet or length of each section if there are more than one weight above freeze point.

If there are two or more weights of pipe above the estimated freeze point, each length can be used with the proper pipe weight to obtain a partial weight. The partial weights can then be added to obtain the total weight of pipe above the freeze point. The use of the chart of Figure 2 will be explained more fully in the example that follows.

With earth movements eliminated from consideration, all of the variables except temperature rise and external pressure increase cause added tension so the necessity of keeping the initial landing weight to a minimum is obvious.

It can be said generally then that the landing weight should be the actual weight in air of the maximum amount of free pipe, plus an amount necessary to overcome the lengthening effect of anticipated temperature increases or external pressure increases that are likely to occur before the freeze point moves upward a substantial amount. If the freeze point is known to move upward rapidly the lengthening factors mentioned probably can be disregarded.

## EXAMPLE PROCEDURE

A method of determining a satisfactory landing weight is shown in the charts of Figures 1 and 2. Let us assume that the 10,000 ft. 7 in. casing program consisting of 8300 ft. of 7 in. 26 lb. N-80 with long couplings on top and 1700 ft. of 7 in. 29 lb. N-80 with long couplings on bottom previously referred to, is set in an area where the following conditions are encountered:

1. Calculated top of cement from displacement figures — 6000 ft. from the surface.
2. Final freeze point — 1000 ft. from the surface.
3. Average net pressure increase inside the free casing as compared to landing pressure—3000 lb. per square inch.
4. Maximum average temperature rise of the free casing after landing—15° F.
5. Maximum average temperature drop of the free casing after landing—18° F.
6. Diameter to thickness ratio, D/t of 7 in., 26 lb. Casing = 19.34.

It will be assumed that the final freeze point and the temperature and pressure changes listed have been determined from other wells in the area. No attempt will be made in this discussion to go into the mathematics of temperature vs. depth predictions for flowing and static conditions.

The first determination to be made is the location as near as possible of the actual freeze point of the casing at the time it is landed. Some operators have used temperature surveys to locate the top of the cement and this method is probably satisfactory in most cases, especially when the result checks with displacement figures. However, if it is desired to make another check on the location of the freeze point, this can be done by the stretch method of Figure 1. In the example to be worked out the nominal pipe weight

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above the calculated cement level is 26 lb. per foot so a horizontal line is drawn from this value, (1) to intersect curve 1. A vertical line is then drawn to (2) which yields a weight to slack off of 38,000 lb. This means that the pipe which is hanging cemented in the derrick with the full weight of the string as indicated before cementing should be slacked off in the amount of 38,000 lb. after marking the casing approximately 2½ ft. above the rotary table. In this example it will be assumed that the mark lowered 10⅜ in. so a horizontal line is drawn from this value at (3) to intersect Curve 2. From this intersection a vertical line is drawn to (4) which indicates the depth to the freeze point is 5200 feet.

With the depth to freeze point established at approximately 5200 ft., the chart of Figure 2 can be used to determine a proper landing weight. To obtain the weight of the free pipe, draw a horizontal line from 5200 ft. at (1) to the intersection of the pipe weight of 26 lb. per ft. From this intersection draw a vertical line to (2) which shows the weight to be approximately 135,000 lb.

The effect of the average pressure change on the load at the landing head may be determined next. Since the diameter to thickness ratio of the free pipe is 19.34, a vertical line is drawn from this value at (3) to intersect the diagonal pressure line of 3000 lb. psi which is the average net pressure increase inside the free casing for this example. A horizontal line is then drawn to the diagonal pipe weight line of 26 lb. per ft., and a vertical line is then drawn from this intersection to (4) which yields an added load of 65,500 lb. at the landing head. If this average net pressure increase had been outside rather than inside the casing, the effect at the landing head would be a reduced rather than an increased load.

To evaluate the effect of the 15° F. average temperature rise of the free pipe, a horizontal line is drawn from this value at (5) to intersect the diagonal 26 lb. line. From this intersection, a vertical line is drawn to (6) which shows approximately a 22,500 lb. weight reduction at the landing head for this temperature rise. The effect of the 18° F. average anticipated temperature drop can be found by drawing a horizontal line from 18° F. at (7) to the 26 lb. pipe weight. From this intersection a vertical line is drawn to (8) which shows an added weight of approximately 27,500 lb. at the landing head.

With the above figures in mind, a satisfactory landing weight may be determined as follows: The weight of the free pipe, at the time of landing, is 135,000 lb. Since the 22,500 lb. weight reduction at the landing head caused by the anticipated temperature rise of 15° F., is the only variable in this example that tends to cause slack in the casing, it will be necessary to increase the landing weight by 22,500 lb., making a total landing weight of 135,000 plus 22,500 or 157,500 lb.

If the pipe is landed with a weight of 157,500 lb. at the slips, and the added loads of 65,500 lb. caused by the 3000 psi pressure rise and 27,500 lb. caused by the 18° F. temperature drop are later imposed, the total load at the head will then be 250,500 lb. This load is equivalent to a tensile stress of 33,200 psi in the top joint of casing or a safety factor of 2.41 on the minimum yield strength of the pipe. The safety factor on the minimum pull-out strength of the casing couplings would be 1.84. Each of these safety factors is satisfactory although the 1.84 figure is lower than some operators wish to use.

However, if the pipe had been landed with its full buoyed weight of 225,000 lb. before cementing, and the loads of 65,500 lb. and 27,500 lb. were later brought to bear, the total weight at the landing head would then be 318,000 lb. This load would cause a tensile stress in the top joint of casing of 42,200 psi or a safety factor of 1.90 on the minimum yield strength of the pipe. The safety factor on the minimum pull-out strength of the top coupling would be only 1.45 which is considerably lower than good practice would dictate. Inasmuch as the stress in the pipe itself is not beyond accepted maximums, this problem could be solved by the use of a stronger casing joint.

## CONCLUSIONS

It is believed that the example will illustrate the need of engineering consideration in the problem of landing casing. Were the depth and tensile loads greater, or the pressure and temperature changes more severe, dangerous stresses would have been induced that would cause casing failures.

Several opertaors have stated that they intend to install strain gauges equipped with recording apparatus on the landing joint of casing so that data can be developed as to the actual variation of the load at the landing head. It is believed that an experiment of this type will bring to light reasons for some of the troubles that have occurred in casing after it has been landed. Reference to the data on bi-axial loading in the API paper on "Setting Depths for Casing"[3] will show that large tensile loads have a substantial reducing effect on the resistance of casing to burst and collapse, especially when the tensile loads exceed 50% of the yield strength. Taking this into consideration, the reasons set forth in this paper for keeping the landing weight to a minimum without placing any pipe in compression take on added significance.

## APPENDIX

**Derivation of equation** (1)

The load necessary to produce a stress of 5000 lb. psi in a pipe of sectional area A is shown by the equation

$$P = 5000\ A$$

The relationship between nominal weight and plan end area of casing is closely approximated by the equation

$$A = \frac{W}{3.458}$$

$$\text{so } P = 5000\ \frac{W}{3.458}$$

$$(1)\quad P = 1445\ W$$

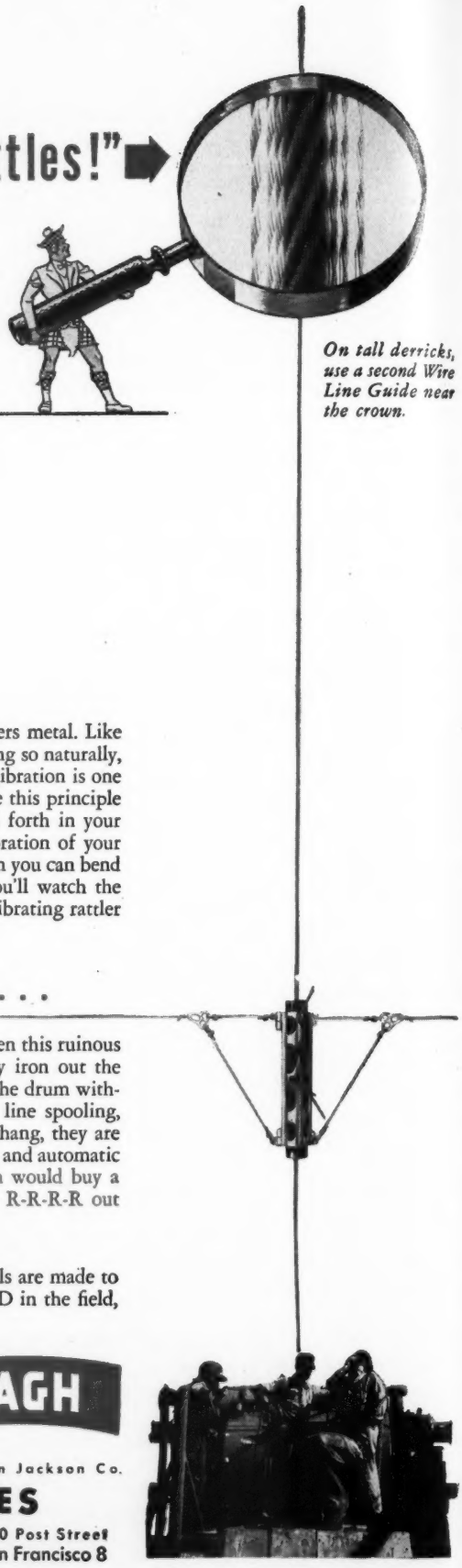
**Derivation of equation** (2)

The relationship of unit stress to unit strain for steel within the elastic limit is

$$S = Ee$$

and since it is desired to obtain the elongation for

# "Rubber Rids Rigs of R-R-Rattles!"



*On tall derricks, use a second Wire Line Guide near the crown.*

## R-R-Rattles Ruin Rigs

R-R-Rattles result from vibration. Vibration murders metal. Like a thief in the night, it sneaks into the noise of drilling so naturally, we don't realize its danger. Yet, next to corrosion, vibration is one of the worst problems the operator has. You can see this principle at work when you bend a piece of wire back and forth in your hands until it gets hot, crystallizes and breaks. Vibration of your wire line bends the metal a hundred times faster than you can bend that piece of wire. You'll see what we mean if you'll watch the traveling wave in your wire line, for there's a real vibrating rattler at your most critical point.

## PATTERSON-BALLAGH WIRELINE GUIDES . . .

are the life guards of your Wire Line, for they dampen this ruinous vibration and protect your line continuously. They iron out the traveling wave, spool line steadily and evenly onto the drum without kinking and cross-back tangles, speed up safe line spooling, and increase life of line 10 to 50 percent. Easy to hang, they are balanced for all types of derricks, simple to maintain, and automatic in operation. Line whip vanishes. Even a Scotsman would buy a Patterson-Ballagh Wire Line Guide to smooth the R-R-R-R out of his line and to save wear-r-r and tear-r-r.

Our new fibre reinforced PBX Special Rubber Refills are made to stand wear and tear. They have been TIME-TESTED in the field, which is your positive assurance of long life.

*Specify* "Best Bet Yet"

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A Division of Bryon Jackson Co.

**WIRE LINE GUIDES**

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$$S = 5000 \text{ psi}$$

$$\text{and } e = \frac{\Delta L}{12 L}$$

$$\text{so } 5000 = E \frac{\Delta L}{12 L}$$

$$(2)\ L = 500\ \Delta L$$

**Derivation of equation** (3)

The change in length due to temperature change for steel is

$$e_t = 12\ L\ K\Delta T$$

and the change in length of steel under stress within the elastic limit is

$$e_s = \frac{12\ PL}{AE}$$

equating $e_t$ and $e_s$

$$12\ L\ K\Delta T = \frac{12\ PL}{AE}$$

$$P = K\Delta T\ A\ E$$

$$\text{since } A = \frac{W}{3.458}$$

and taking $K = 6.7 \times 10^{-6}$

$$(3)\ P = 58.2\ W\Delta T$$

**Derivation of equation** (4)

Barlow's equation

$$s_h = \frac{pD}{2t}$$

represents closely the average hoop stress in a pipe which is subjected to either internal or external pressure when the stress is within the elastic limit.

A change in the applied average pressure, $\Delta p$, produces a corresponding hoop stress change $\Delta s_h$

$$\Delta s_h = \frac{\Delta pD}{2t}$$

The longitudinal stress change, $\Delta s_1$, produced in a pipe that is anchored at both ends caused by an average hoop stress change of $\Delta s_h$ is shown by the equation

$$\Delta s_1 = M \Delta s_h$$

The effect at the landing head of $\Delta s_1$ is

$$P = A \Delta s_1$$

$$\text{since } A = \frac{W}{3.458}$$

$$P = \frac{W}{3.458} M \frac{\Delta pD}{2t}$$

taking $M = 0.3$ for steel pipe

$$(4)\ P = 0.4034\ W \Delta p \frac{D}{t}$$

If the average net pressure change $\Delta p$ is an internal increase, the effect at the landing head is an increased load. If the average net pressure change is an internal decrease (external increase), the effect at the landing head is a decreased load.

**Nomenclature**

- $P$ = Change in load at landing head, pounds
- $A$ = Plain end area of casing, square inches.
- $W$ = Nominal pipe weight, pounds per foot.
- $s$ = Unit stress, psi.
- $E$ = Young's Modulus of Elasticity for Steel $= 30 \times 10^6$.
- $e$ = Unit strain, inches per inch.
- $\Delta L$ = Total elongation, inches, or amount casing lowers.
- $L$ = Depth to freeze point, feet.
- $e_t$ = Total change in length due to temperature change, inches.
- $e_s$ = Total change in length due to stress, inches.
- $K$ = Coefficient of thermal expansion taken as $6.7 \times 10^{-6}$ for steel pipe.
- $\Delta T$ = Average temperature change of free casing, Degrees F.
- $s_h$ = Average hoop stress, psi.
- $p$ = Pressure, psi.
- $D$ = Pipe O.D., inches.
- $t$ = Pipe wall thickness, inches.
- $\Delta s_h$ = Hoop stress change caused by $\Delta p$, psi.
- $\Delta p$ = Average net pressure change on free pipe, psi.
- $\Delta s_1$ = Longitudinal stress caused by $\Delta s_h$, psi.
- $M$ = Poisson's Ratio taken as 0.3 for steel pipe.

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## The Investment Value of Injection Gas

*(Continued from Page 9)*

Now, for a quick review. The statements of two experts on pressure-maintenance operation have been referred to. Both of these support the view that the greatest possible ultimate recovery of oil from a reservoir will be obtained by maintaining the reservoir at its original pressure. To maintain the initial pressure it is necessary to return to the formation all of the gas produced plus enough additional gas to occupy the space containing the liquid volume of the oil withdrawn. Several possible sources for obtaining this gas have been discussed.

Whether these sources of gas can be profitably utilized depends upon the source of the gas, the magnitude of the operation, and the characteristics of the particular reservoir being investigated.


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# Kern County OIL NEWS

BRUSHING ITSELF OFF, industry in general examined its "Charlie horses" caused by the steel strike and found fewer "black and blue" spots existed in the oil department. The oil industry has taken care of its employees very well as a whole, and has given them everything ahead of schedule. By and large, the boys in the "heave-ho" division have participated, after a fashion, in the profits of the operators. Since oil is just an infant among the major industries of the nation, it has been able to profit by the examples of the old line problems and met them before they had become anything beyond opportunities.

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BARNEY BARNARD of the local Conservation Committee of C.O.P. regrets he cannot complain too much or reveal anything startling. Need still exists for fuel oil. Some gasoline stocks are storage-bound in appreciable amounts. He predicts early "firming up" of any instability as regards reconversion of jobs for the returning veterans.

Efficiency of operations is taking place with their return and, of course, a few setbacks or changes always make a busy pay roll clerk. There are no gripes, no displaced persons. . . . Oil has absorbed labor conditions—best since October.

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WITH MORE conscientiousness than one would think, Kern County's huge oil industry views politics and elections with alacrity. But unlike some minorities, it accepts the results with commendations to the majority.

---

THAT the California Oil World is an "oil bible" for Kern County governmental officials, oilwigs, businessmen and industrialists, was further elicited when the April 2 "facts and figures" issue reached executives' desks. The California Oil World is scrutinized with interest and enthusiasm in Kern County, and has proven an invaluable fact-finder when oil figures are involved.

**DISCOVERY WELL—F. F. Latta, Kern County historian, calls attention to the Kern County discovery well in Kern River Field. Oil was discovered here at 70 feet in 1899. The original hole is "boarded over" for protection. Visitors, however, may lift the boards and peer down into the hole. Oil is still visible at the bottom of the well.**

FISHING for trout, Paul J. Howard, Kern's freelance geologist-consultant, recently settled for a limit of "crappies" in front of his Bass Lake cabin after a trek to the higher places with muddy freshets.

---

KERN'S "drop in the bucket" price rise in oil has come too late for the assessor's rolls this year. In isolated instances, however, the extra check may prevent borrowing to pay the first installment.

---

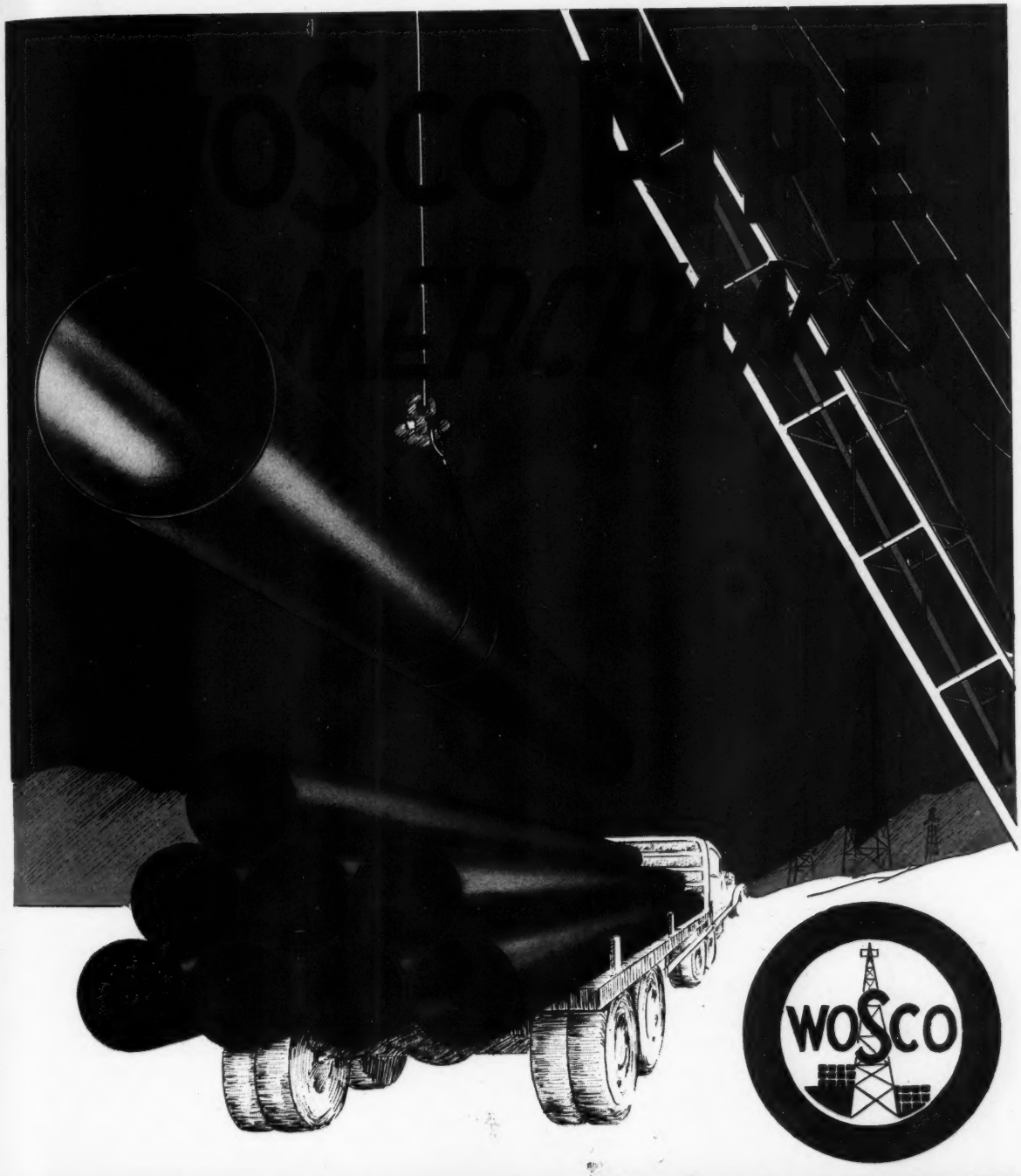
WINDING UP the assessor's junkets out in the values of pay dirt for tax collectors, the tax "eggs-purts" are flourishing slide rules for estimates. In the 27-B Zone, where production was pulled down through high rates of production from reserves, the outcome is certain: Values will be down. In Edison and Cymric, and at Santiago, the reverse may be in circumspect.

---

E. C. (CURLEY) EMMONS of the supply company by the same name at Taft, whose service operations cover an active radius of 50 miles, reports all crews working at top performance and in prospect of continued activity. Said he one day this month: "Taft's oil business was never any better. We were brought up on 'hard-times' talk which has been with us since 1910. No slackening of the pace has 'spudded in'."

---

THE AAPG'S annual May barbecue and sweetcorn cob throw at Newhall in some respects attests to the anniversary of oil discovery in California. Earl Noble and Bob Atwell of Union reported to fellow-geologists in Kern on the state of the association. A field trip over the Del Valle and Oak Canyon areas was filled with interest and considered eventful. Local representation was good, while skeleton crews at home carried on the detail at the offices.

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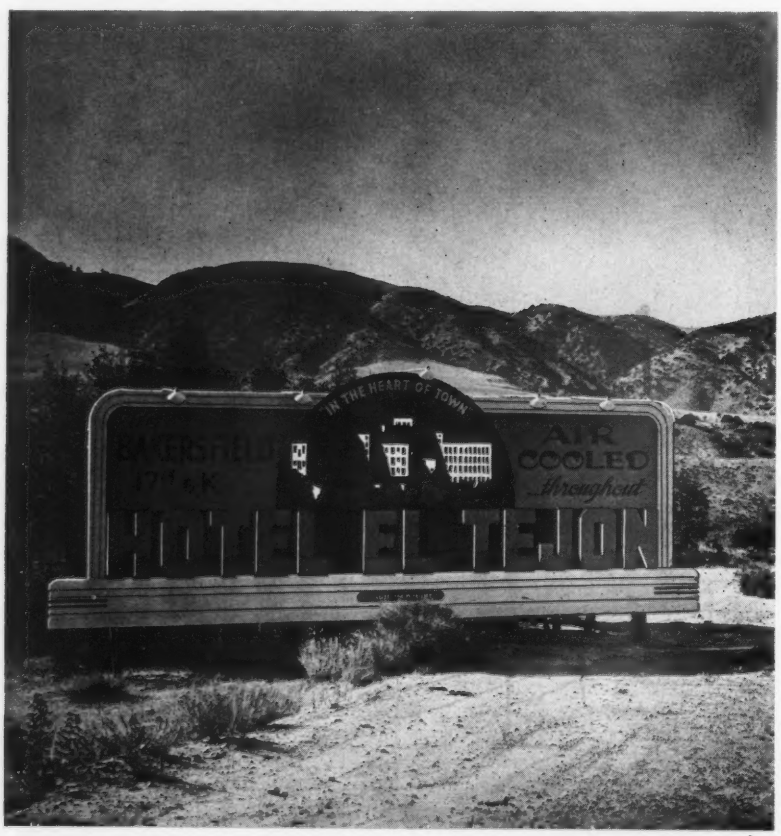
**Taft, California**




INVADED by von Glahn with legions of Kings County gilt, Kern County and the boys on the welcome committee are giving Elmer the "new member" initiation ritual. In the Kern River Field, the Elmer C. No. 1 has been "spudded in," and at 1428 feet preparations are being made for the "well-casing-setting-in" party. Best of luck to the P. H. Frank Drilling Company, to Engineer P. L. Blodget, and to friend Roy Guthrie, vice president of P. H. Frank, Inc.

---

ANOTHER million pieces (not footage) of small three-inch tubulars, about two feet long, have been

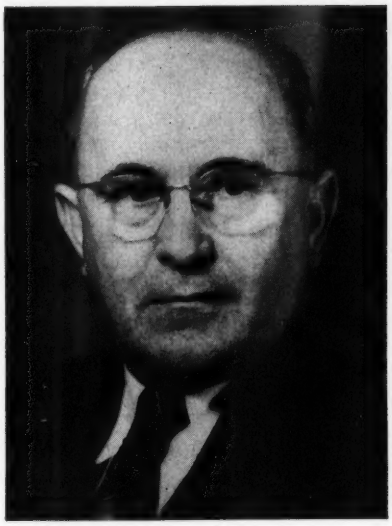
**STIRS INTEREST—One of the few steel-derrick wells in historic Kern River Field is the Elmer C No. 1, which is stirring considerable interest in Kern County oil circles. The well is a private enterprise of P. H. Frank and Elmer von Glahn. It was "spudded in" on May 9, and has been drilled to 1428 feet. Oilmen are watching with eager anticipation as preparations are made to set the well casing. P. L. Blodget has been commended for his work as engineer of the well. In an interview with Roy Guthrie, vice-president of the P. H. Frank, Inc., oil well drilling, he expressed the thought that Kern County should welcome with gusto the invasion of von Glahn capital from Kings County for the purpose of exploiting Kern's resources.**

sawed and stacked at the Highway 99 yard of the Western Oilfield Supply Company, for existing orders from farmers. In a pow-wow with Charlie Lake, co-partner and general manager of the company, it was revealed that this public relations service for the Kern agriculturists has developed into a valuable, enterprising department. This is one

of the many services WoSco has to offer in qualifying the firm as "pipe merchants." It's another Kern County **first,** as near as your scribe can tell.

---

N.A.M. (National Association of Manufacturers), which met in Los Angeles this month, was scouted by more than one oilman to see if business and manufacturing were planning to keep the old house in order. At Ambassador's Embassy room the press and NAM featured a panel that drew generously upon the best management brains in the country. In retrospect, subsequent to the meeting, a summation "points up" a problem or an opportunity or two: (1) Effort needed by business to meet the challenge of its opponents; (2) New salesmen needed for their product (free enterprise), who have more appeal than a chorus girl in a flannel nightgown; (3) take inventory of their production ability on hand to be "ready to go" as never before at the close of all other wars; (4) a national economy no longer exists in a vacuum free from political forces; (5) public action must be added to business affairs; (6) businessmen must quit calling signals and start carrying the ball if they are to score against their opponents . . . The petroleum industry discovered this almost too late, but those representatives present left the conference grateful for an iota of information for encouragement to keep crossing the goal line into pay dirt.



**KERN COUNTY'S ASSESSOR: J. H. (John) Hanks, one of Kern's most popular officials. He has been assessor since December 1944 when he was appointed by the Board of Supervisors to fill out the unexpired term (1946) of Tom F. Burke who had his demise after serving for over a quarter of a century as County Assessor. Oilmen like the slant "Josh" has on farm and petroleum values. Coming from Truman's "showme" country, Hanks never outgrew the habit. Whenever, he might be wrong he always says "showme" and I'll make it right.**

---

FRED C. GILBERT of Tret-o-Lite dropped in the other day with a box of cigars from a friend of a friend of your scribe. It was appreciated. At first we thought Fred had had an increase in the family totaling triplets. In that respect, Fred tells us that business has had quintuplets. And no wonder, what with Fred's personality, ability, efficiency and fast work. There was no other news as he hurried out to his automobile, where, as usual, he had left the motor running.

---

HOWARD C. BROWN of the B. & B. Oil Tool Company, the


**OIL FIELD CONSTRUCTION CO.**

**Boiler Plants, and Insulation**

**Brick and Structural Steel Work**

**Authorized Agent for Johns-Manville**

**INDUSTRIAL INSULATION**

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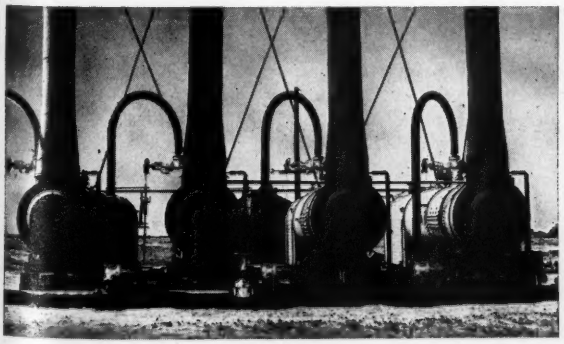
**C. E. MANLEY, Div. Manager**

**Phone 30750**



**THANK YOU, LADY!**

Yes, we thank the lovely lady in the illustration for posing so gracefully with that fine Manila rope. Unfortunately, however, the supply of Manila fiber is still extremely limited and it will probably be some time before Manila Rope will come out of the "scarce" class. When you once more see the famous trade mark of Tubbs Extra Superior Manila, it will be a rope built to highest standards of perfection—**a rope worth waiting for ! !**

**TUBBS CORDAGE COMPANY**

**SAN FRANCISCO** **SEATTLE**

**Los Angeles** **Portland** **Chicago** **New York**

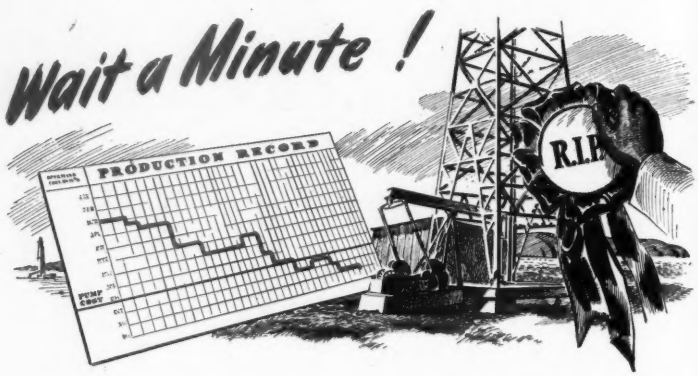
**OIL EXPERT IN KERN COUNTY: Added to the public facilities of Kern County has been F. C. Hodges (California Oil World Second Issue December, 1945) petroleum engineer in the office of County Assessor J. H. (John) Hanks at the Court House in Bakersfield.**

"liner cleaners" concern, again has moved back to Supply Row from the Riverview area.

C. R. (Chuck-to-me) BALL, of the Hillman-Kelley firm, was a recent visitor to Kern. As a matter of fact, he lives here as much as usual, although for voting purposes he and his family have moved to Long Beach. To most of us, "Chuck" may seem "always hungry," since his secondary office is the El Tejon dining room.

RALPH LAVIN is dead. Kern County's supervisor of the Third District for seven years passed away suddenly a fortnight ago. To the oilworker and operator alike, Ralph Lavin was a friend. He liked people, and people from all walks of life liked him. Few understood him. They understand him better now, for the good that men do lives after they die. Sometimes this good is not inventoried except in eulogies of final rites. Ruffneck and oil operator alike were at Ralph Lavin's funeral. Judge Ardis Walker of Kernville, a life-long friend, officiated at the services. None present at the final tribute will forget what the good Judge said in simple, appropriate language . . . the kind that men and women most understand. For some time, Ralph Lavin had been fighting a dreaded malady, and this month when he grew weary and tried to relax, the body was not willing. Untimely, he leaves his gracious wife and daughter, together with his father, relatives and a score of friends. Now all must look to new leadership, and try to find comfort in life's mysterious cycle of existence, transition and demise.

CHARLES E. MANLEY, of Oil Fields Construction, has bitten off something he can also chew on under the able management of an old friend, Merle Taylor. Six weeks ago, Charlie and his associates ran across a first-class hardware store at Tulare on Golden State Highway U. S. 99, in the heart of town. Egged on by a slogan, "We Know Pumps," backed up by a half-dozen nationally known concerns in various other kinds of merchandise of a hardware nature, the deal was soon in and out of escrow. Keith Manley, Ted Henry and A. T. Jensen comprise other members of the firm. Charlie is one of the angels, although equal interest is obtained by all. His first love, however, is the

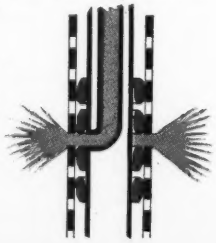




High-Pressure Washing may bring that "dead" well *back to life!*

**Before you abandon that well which no longer pays its pumping cost, read and consider this statement of fact:**

**Time after time, operators in almost every California oil field have called in McGaffey-Taylor to wash supposedly dying wells: in a high percentage of cases, the use of M-T Pressure Washer has turned those "dying" wells into profitable producers—some of them producing even more than when they were first brought in.**

**To get the full story on *how* and *why* the McGaffey-Taylor Pressure Washer is able to remove the hard-packed material which gradually strangles a well,**



***Write for NEW Well Washing Bulletin, or ask a representative to demonstrate transparent model.***

McGaffey-Taylor
CORPORATION
WELL-WASHING SERVICE
2852 CHERRY AVENUE, LONG BEACH 7, CALIFORNIA
PIERCE ROAD, BAKERSFIELD, CALIFORNIA

OFC business, where he has just completed another stanza in that category.

---

JOHNSON VALVE COMPANY is taking its place among the up and coming. Seven years ago, Owen Johnson thought the best, easiest and most honest way to make a living was to work for "Curley" Emmons. He was too well satisfied.

Today, after starting with a notebook, a valve and a will to work as hard for himself as he did for Emmons, Owen Johnson has over two thousand valves on hand coming and going from repair to replacement. He has done business with them all. Besides Owen himself, there are Roscoe Hindman, Chuck Pinnell, Ivan Champlin, Slim Horton and A. R. Moore working over orders brought in by head Salesman Ted Waltimire and accepted by Foreman Art Christensen. Their business is reconditioning valves—any kind and any size. Another mark of the American oilman's ingenuity. Credit Carl Bray as auditor, office boy and "watchdog" of the Johnson treasury.

---

ONLY THING about a good thing, other people want to get into it, too. D. H. (Chuck) McKee (the 'D.H." is for deep hole) over at Taft, is in the valve business, also. He was out checking over Owen's enterprise. He discovered that Owen wanted to help him help himself and Owen, too. Business acts this way in Kern.

---

R. R. (DICK) WHITAKER is the name of Kern's new head of the Transportation and Highways Department of the county chamber. Dick's public relations job with the Standard Oil Company for the San Joaquin Valley and, of course, Kern County, has come in handy for getting over the highways to collect the "lowdown" on good, bad and indifferent roads. Incidentally, Dick says that some of his associates, upon returning from South America, report liberal economic traits being manifest south of the border. "South America is becoming industrialized without coal or railroads by a quick jump from the wood to oil, from the burro to the bus, truck and airplane," he said.

ART OLIGER, of the great I.P.P.A., has been more than successful in getting trade organizations and similar groups to wire Congress expressing favor of the Gossett Amendment to the OPA Bill, which will stabilize the oil industry when supply equals balance or demand. "Art is doing a fine job in an easy approach to the problem before us," said Angus Crites the other day at Maricopa.

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TWO KERN COUNTY employes of the Standard Oil Company this month were awarded service pins for their faithful service to the company. Vincent C. Sheehan, of the manufacturing department, Bakersfield, received a 25-year pin; and Edward B. Petty, of the purchase and stores department, Taft, was awarded a 10-year pin.

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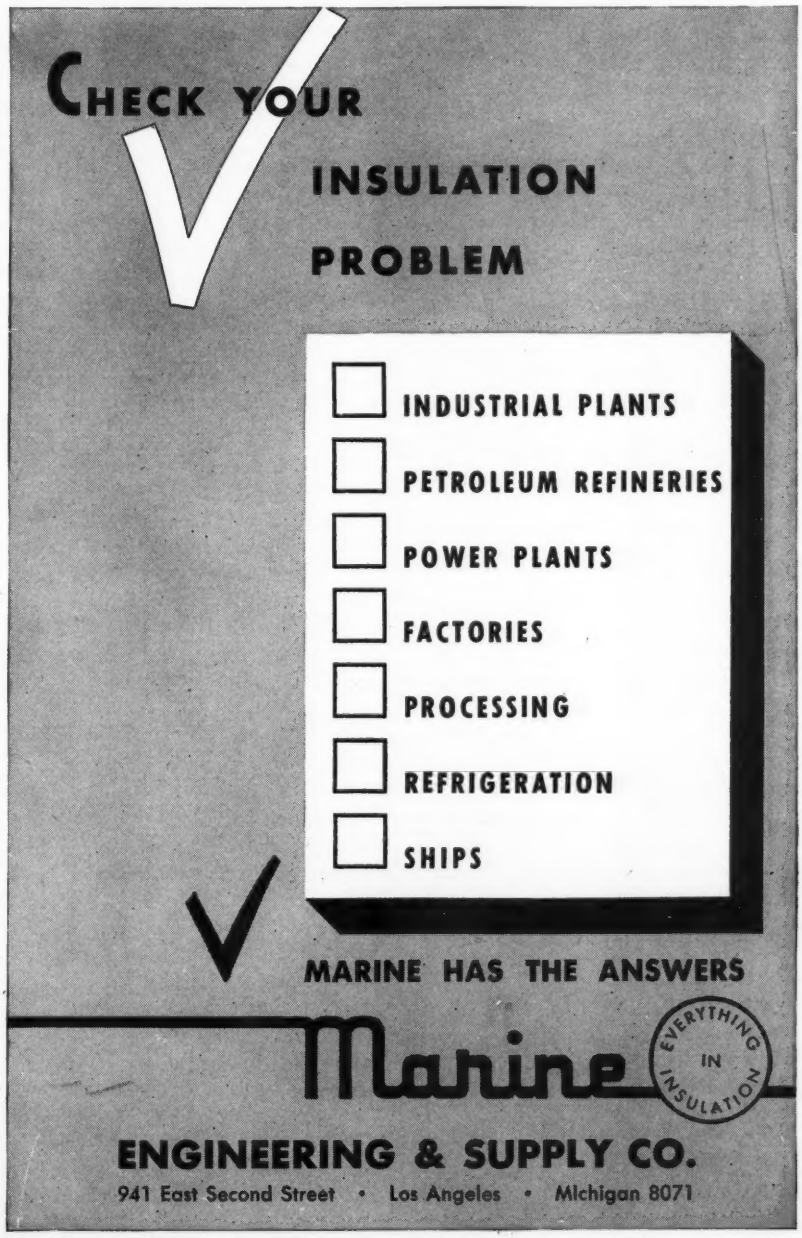
CHARLES H. BIGGAR, noted Kern County architect, died this month. He designed some of Kern's outstanding buildings, including structures of the oil industry here, and leaves many friends in the county oil circles.



# Field Development

PREPARED BY CALIFORNIA OIL WORLD NEWS SERVICE

## Los Angeles Basin

### East Los Angeles Jobs Make Progress

Richfield Oil Corp's first attempt for production test in Keller No. 1 in Sec. 9-2s-12w in the East Los Angeles area was inconclusive. Bottomed at 7682 ft., with casing cemented at 7576 ft., the well is cleaning out for another attempt to try production.

Edison No. 1 is drilling at 6500 ft. Vail No. 2 has reached 7400 ft. In Sec. 15-2s-12w, C. G. Willis is drilling Simons No. 1 at 4550 ft. C. C. M. O. Co., Bandini No. 1 in Sec. 21 is testing. Total depth is 10,058 ft. Shell Oil Co. is coring Pansini No. 1 in Sec. 23 below 9200 ft.

### Ramona Hills Venture Drills

In the Ramona Hills sector of the Del Valle area, Claude Kavanaugh and Leroy R. Wilhite are drilling their initial wildcat test in Sec. 8-4n-17w at a depth near 2050 ft.

### Newhall Try Rigging Up

Seaboard Oil Co. is rigging derrick to begin drilling its Mission Land No. 8-1, a wildcat test in Sec. 25-3n-16w in the vicinity of Newhall.

### Costa Mesa Venture Idle

Silver Divide Mines Co., Sierra No. 2 in Sec. 23-6s-10w in the Costa Mesa area is idle at 3904 ft., following a series of tests.

### Shell Rigs Beach Well

Shell Oil Co., Inc. is rigging for Bryant Two No. 3 in Sec. 34-4-12 in the Seal Beach field. Community No. 1, on production test of gun-perforations in the interval of 7010-7130 ft., swabbed a little oil and water. Perforations now are being washed.

Atlantic Oil Co. and O. M. Slosson, meantime, are tearing out contractors equipment on Bixby No. 1 to reinstall own rig and squeeze and test at intervals. On test of the gun-perforated interval of 9000-9165 ft., muddy water and some oil was swabbed.

### Leffingwell Try Finally Abandoned

Standard Oil Co. has abandoned Behnke Comm. No. 1 test in Sec. 14-3s-11w in the Leffingwell area, Los Angeles County. Original depth is 10,273 ft. Redrilled depth is 5680 ft. Recovery on a series of tests of various intervals was largely salt water. Nearer La Habra, Stern Comm. No. 2-1 in Sec. 7-3s-10w is spot coring at 9825 ft.

### North Montebello Well Going Down

North of the Montebello field, Lodico Oil Co. is drilling its North Montebello No. 1 wildcat in Sec. 35-1s-12w is shale at a depth approximating 800 ft. Gibson Drilling Co. is in charge of operations.

### Brea Project Making Hole

El Rancho Exploration Co.'s El Rancho No. 1 in Sec. 16-3s-11w in the Brea area, Los Angeles County, continues to make hole ahead at a depth of 2155 ft.

### Dunlaps Add Beach Producer

D. D. and Dorothy Dunlap have completed Aldrich No. 3 test in Sec. 18-6s-10w in the Huntington Beach area, flowing a substantial amount of oil from a total depth of 3073 ft. Perforations oppose the A and B zones.

### Beach Work Continuing

Hiawatha Exploration Co. is preparing to move ahead with its Atha No. 3 in Sec. 13-6s-11w in the Huntington Beach area. No. 2 last was reported flowing 479 barrels of 23.8 gravity crude oil daily through a 5/64-inch bean. R. W. Jerman's Gothard No. 1 in Sec. 27-5s-11w is a rig only.

### Gardena Test Recovers Fish

Having successfully completed a major fishing job, Ohio Oil Co. is drilling steadily ahead below 10,250 ft. in its Gardena Comm. No. 4-1 Sec. 23-3s-14w in the Gardena area, Los Angeles County.

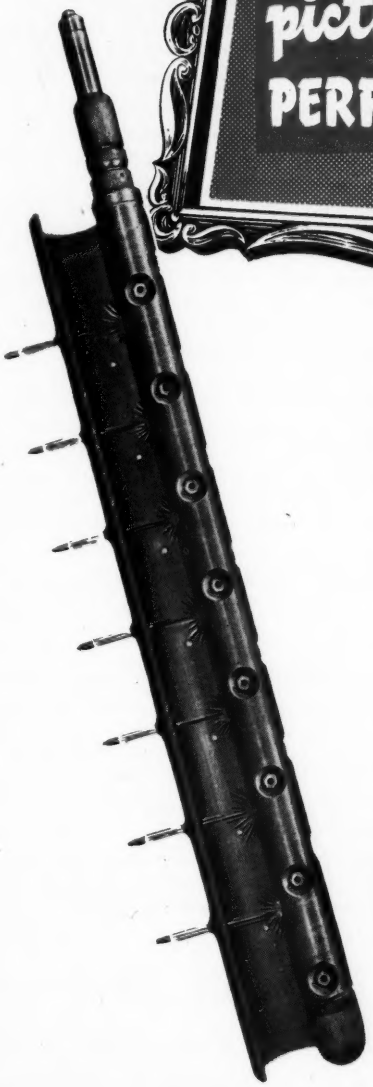
### Richfield Try Starts Drill

Vejar No. 1 in Sec. 35-3s-9w in the Richfield area, Orange County, has commenced operations. A Texas Co. project, hole last was reported down 450 ft. At the eastern end of the Montebello field, the company is drilling Ciocca No. 1 at 8850 ft.

### El Segundo Test Rigging Derrick

Shell Oil Co., Inc., Operator, is rigging derrick to start the drill in

If you want a perfect picture of the PERFORATION PATTERN



JUST LOOK AT THE McCullough GUN!

Because McCullough has always fired all the shots at the same instant, while the gun is at rest in the exact location specified, the perforations in the casing are spaced just exactly like the barrels in the gun itself. And McCullough has over 30 different types and sizes of guns—one to fit every type of gun-perforating job—one to fit your job.

Ask us about McCullough's NEW stream-lined *BURR*-LESS Bullet—the Armor-Piercing Bullet which punches clean, *burr*-less holes in the heaviest casing, with FULL penetration into the formation.

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# BAKER *Triplex* CEMENTING SHOE

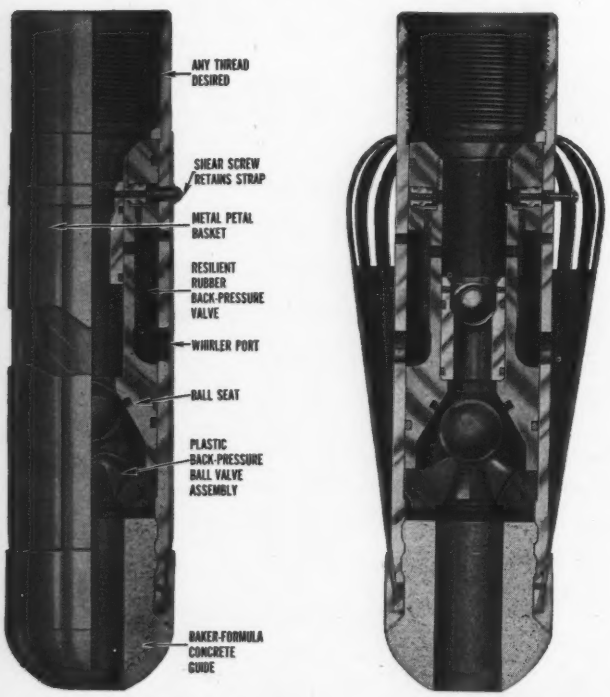
## Packs Off in Large Diameter, or Irregularly-Shaped Holes, and Retains Cement Slurry Above the Shoe

**WHAT IT WILL DO.** The Baker TRIPLEX Cementing Shoe basically is a casing shoe and operates as a conventional float shoe while running-in, washing and conditioning the hole. Its principal use is to retain all cement slurry above the shoe, thus protecting formations below from cement contamination.

All cement slurry is directed upward through side whirler ports; a sleeve-type, back-pressure valve prevents any return flow of slurry. The Baker Metal Petal Basket is intended to form a bridge, thus preventing cement slurry from settling into permeable, low-pressure zones below. The Basket is indispensable in large-diameter, or irregular-shaped holes.

**FAST, SAFE OPERATION.** The Baker TRIPLEX Cementing Shoe is secured to the lower end of the casing and provides the advantages of all Baker FLOATING Equipment in safely guiding, floating and landing strings of casing of any size or length. The rounded nose of Baker-Formula Concr guides the casing past any side-wall irregularities. The Baker PLASTIC Va Assembly—with the buoyant Plastic ball that floats in cement slurry—ma tains a constant, leakproof seal against either high or low pressure.

Then, after reaching the desired point in the hole, circulation is establish through the ample interior passageways of the shoe, and the hole is con tioned preparatory to cementing. The Tripping Ball now is pumped (or allow to gravitate) down the hole to seat upon the Tripping Valve. A pressu of 400 to 500 psi is applied to the casing which shears the screws in t Tripping Valve, permitting it to move downward and expose the cementi ports. Shearing the screws also releases the hold-down strap around t basket, allowing the basket to expand outwardly against the wall of t hole. The cementing operation is then carried out in the conventional man with all cement slurry directed upward and held above the shoe by t expanded Baker Metal Petal Basket.




RUNNING-IN POSITION EXPANDED POSITION

**STRONG, SIMPLE CONSTRUCTION.** The Baker TRIPLE Cementing Shoe consists of a whirler float shoe with a Baker Metal Pet Basket fastened on the shoe below the cementing ports. All cement slurry directed upward and retained above the shoe. A fabric reinforced, resili rubber, sleeve-type back-pressure valve opens readily to permit passage the slurry into the annulus above the shoe, but closes instantly to preve any return flow of slurry.

All internal parts are made of readily drillable materials. Two one-h inch set screws hold the inner assembly stationary to facilitate drilling o the shoe.

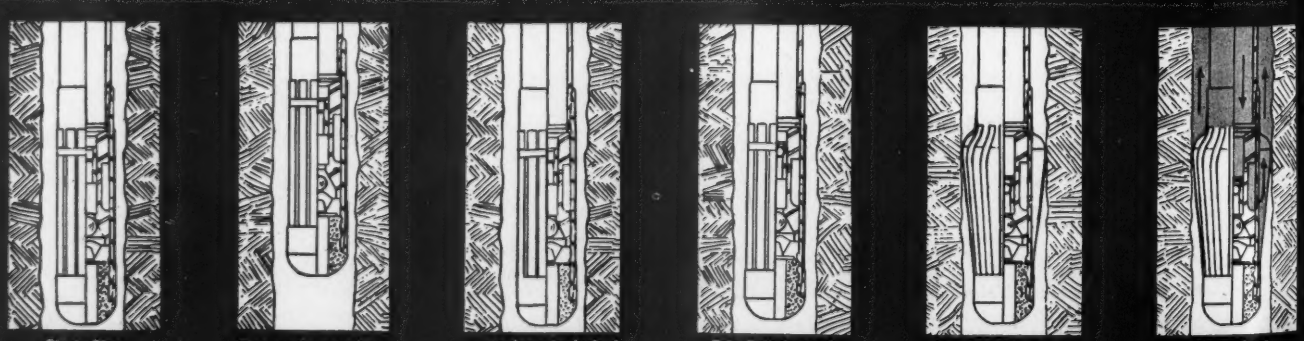
**EASY TO ORDER AND USE.** When ordering the Baker TR PLEX Cementing Shoe it is necessary to give only the size, weight and thre specifications of the casing upon which it is to be run. It is advisable furnish hole size, because (a) the TRIPLEX Shoe is approximately ½" larg than the O.D. of a standard casing coupling; and (b) the Metal Pet Basket must be of sufficient size to expand and pack-off even in large-dia eter and irregularly-shaped holes.

The use of a Baker TRIPLEX Cementing Shoe is no problem to experienc cementers. Its effectiveness is evident from the demand from all active fiel Contact your nearest Baker office or representative.

**BAKER OIL TOOLS, INC.**

**Houston — Tulsa — Los Angeles — New York**

*"There's a Baker Man in Your Territory"*


Floats Pipe
Pipe can be moved up . . .
. . . or down to desired position
Trip Ball dropped and seated
Tripping Valve down, Basket expanded
Slurry kept above shoe

Six Companies Fee No. 1 wildcat test in Sec. 2-3s-15w, west of Mines field and northwest of El Segundo. The six companies—Shell, Union, Standard, Richfield, Tide Water Associated and The Texas Company—bought 1300 acres in the area years ago from the Security-First National Bank for a reported $900,000. The ground involved is a portion of the old Sausal Redondo Ranch. Some 900 acres of the companies holdings were sold to the city of Los Angeles for Mines Field runways at $9.70 an acre, with the mineral rights retained.

## Whittier Try Sets Casing

Having cemented 7-inch casing at 3530 ft., J. Paul Sievers is ready to gun-perforate between approximately 400 and 3500 ft. in Atlas No. 1 in Sec. 17-2s-11w in the Whittier area, preparatory to inaugurating trials. Total depth is 3593 ft. in gray sand.

Between the old Whittier field and Turnball Canyon producing area, Delaney Petroleum Co. is considering drilling a wildcat test, south of Los Angeles Brewing Co.'s Jones No. 1 in Sec. 24, which was abandoned a year ago at 2745 ft. Cinnabar Drilling & Exploration Co. hold substantial acreage in the area.

## Del Valle Well Running Tubing

Superior Oil Co. and British-American Oil Producing Co. are running tubing in Black No. 2 in Sec. 13-4n-18w in the Del Valle area of Ventura County. Total depth is 3566 ft. The Black zone was logged at 2985-3285 ft. Location for Black No. 3 is grading.

The Texas Co. is rigging up Kern No. 13-SW-18 and has cellar dug for No. 13-NE-18 in Sec. 18-4n-17w. Bankline Oil Co. has spudded-in Black No. 102 in Sec. 13.

## Aliso Canyon Try Pumping

Northwest of the Aliso Canyon field, Standard Oil Co. has finished Wigdal No. 1 in Sec. 19-3n-16w, Los Angeles County, at a plugged depth of 9525 ft., pumping 270 barrels daily of 18.7 gravity crude oil, cutting 9.5 per cent. The well is about a mile northwest of Barnsdall Oil Co.'s Roosa well, which produced some oil from around 9000 ft.

## Orange County Well Operating

Tide Water Associated Oil Co.'s Norris No. 1 in the Fairview area in Sec. 8-6s-10w, Orange County, is standing with surface pipe cemented on present bottom at 545 ft.

## Chino Explorer Getting Ready

Grayco Oil Co. of Norwalk, J. P. Gray, O. W. Murphy and G. P. Hulbert, plans to drill a well in the southeast quarter of Sec. 13-3s-8w near Chino in San Bernardino County. The acreage is comprised of the 400 acres formerly belonging to Mahala Oil & Gas Co. The new site is situated some 600 ft. east of the old Mahala No. 1, which made a little oil. The lease is two miles northwest of Prado Dam on Santa Ana River.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# San Joaquin Valley

## Belridge Try Sets Protection String

Belridge Oil Co. is drilling steadily ahead below 10,500 ft. in No. 62-W-33 deep test in Sec. 33-28s-21e in the South Belridge field, after cementing an 8 5/8-in. protection string around 10,000 ft. This was all the casing available or it would have been cemented on bottom at that time at 10,370 ft.

If the company's quest for a new deep zone in the field should meet with production success, effect would be beneficial to holdings of a number of other operating organizations. Belridge Oil owns most of the strategic ground, but varying amounts of land are also held by General Petroleum, Ohio, Standard, Richfield, Shell, Lincoln Petroleum and Universal Consolidated.

## McKittrick Well Drilling Deeper

Drilling in cherty shale at 6215 ft. was the latest word from W. T. Woodward and American Placers, Inc., Flickinger No. 1 in Sec. 36-30s-22e in the McKittrick area. On an electric log run to 6060 ft., a few sand streaks were indicated, which will be the subject of trials at a later date.

## Kern River Try Gives Up

Having found the Vedder gray, Bender Oil Operations has abandoned Claire No. 1 in Sec. 22-28s-28e in the Kern River area. Total depth is 2789 ft., with top of gray Vedder placed at 2676 ft. The top of Olcese was placed at 853 and Pyramid Hills at 2725 ft.

## Richfield Widens Temblor Oil Field

Richfield Oil Corp. has completed M. & L. Fee No. 2 in Sec. 18-29s-21e in the Temblor field, flowing initially at the rate of more than 1000 barrels of 18.5 gravity clean oil daily. A westerly extension test, the well was carried to a total depth of 2787 ft. in the Carneros zone. Casing is set at 2715 and liner landed at 2785 ft. Perforated interval is 2711-2785.

The 160-acre lease has been owned outright by the company for 18 years. Plans are to drill up the property as soon as possible, with derrick being rigged for M. & L. Fee No. 3 on location 430 ft. northwest of No. 2. The first well drilled by Richfield in the area was a duster.

## Devils Den Try Coring

Barnsdall Oil Co. continues to core ahead below 1250 ft. in Batest No. 1 wildcat test in Sec. 20-25s-19e in the Devils Den area. Core at 1182-1202 ft. recovered 2 ft. fine gray sandstone and a similar amount of oil sand. Recovery of core at 1202-1222 recovery was 7 ft. fine gray sand and thin streaks of oil sand.

## Cymric Well Completed

H. H. Magee, Operator, Oceanic-Magee-S.F. No. 2 in Sec. 22-29s-21e has been completed in the Amicola zone, pumping 75 barrels of 14 gravity oil daily, cutting 2 per cent. Depth is 1398 ft., with casing cemented on bottom. No. 4 is drilling below 1450 ft. Meantime, Universal Consolidated Oil Co.'s Sauerdough No. 7 in Sec. 23 is drilling at 5000 ft. in hard shale.

## Paloma Well Stops Drill

Western Gulf Oil Co.'s K. C. L.-B No. 83-12 in Sec. 12-32s-26e in the Paloma area has quit the search for oil at a total depth of 10,870 ft. The Simons sands evidently were too tight to be produced. Locaiton falls between established producing wells on three sides. L. A. A. C. No. 76-1 in Sec. 1 is coring at 11,706 ft. in cherty shale.

## Dome Test Still Fishes

In the Middle Dome area of Kettleman Hills, Standard Oil Co. is running wall hook in its No. 73-30V in Sec. 30-23s-19e to try to recover wash pipe, which makes up the balance of fish still remaining in the hole. Total depth is 10,797 ft.

## Kings County Wildcat Starts

Approximately six miles west of an old well which is being deepened by Kings County Oil Co. at 10,190 ft., Western Gulf Oil Co. has started the drill in von Glahn No. 14-8 in Sec. 8-23s-21e in the Dudley Ridge area of Kings County, and has cemented surface pipe at 505 ft.

The Kings County Oil job is located in Sec. 4-23s-22e, Tulare County, and is known as von Glahn No. 1. Gas showings have been reported and electric log was run to 9945 ft.

## Round Mountain Try Rigs Derrick

Miller and York is rigging up K. C. L. No. 3, a wildcat test located 1487 ft. north and 1102 ft. east from the southeast corner of Sec. 13-28s-28e in the Round Mountain area.

Officials of Pacific Gulf Oil Co. believe the Vedder formation will be encountered above 2600 ft. in the company's scheduled test in Sec. 30-28s-29e, one-half mile southwest of the field. They view the ground to be questioned as a possible new sector of accumulations, rather than an extension of the main Round Mountain field.

## Tejon Try Sets Pipe

C. C. M. O. Co., No. 2-32 in Sec. 32-11n-19w in the Grapevine-Tejon area has 9-inch casing cemented at 2610 ft. The top of the main oil sand was placed at 2607 ft., with total depth 2676 ft. in oil sand.

In Sec. 19-11n-19w, Tejon Oil Co., No. 1A is standing temporarily suspended. Bottom is 10,802 ft. in shale.

## Union Begins Wildcat Play

About eight miles southeast of Tipton, Union Oil Co. has location staked for Griffen No. 45-8 wildcat in Sec. 8-22s-26e, Tulare County.

## Temblor Jobs Drilling On

Beverly Trading and Exploration Co. is drilling W. P. No. 1 in Sec. 30-29s-21e in the Temblor area of

# Baash-Ross News

BAASH-ROSS TOOL COMPANY · LOS ANGELES · HOUSTON · NEW YORK

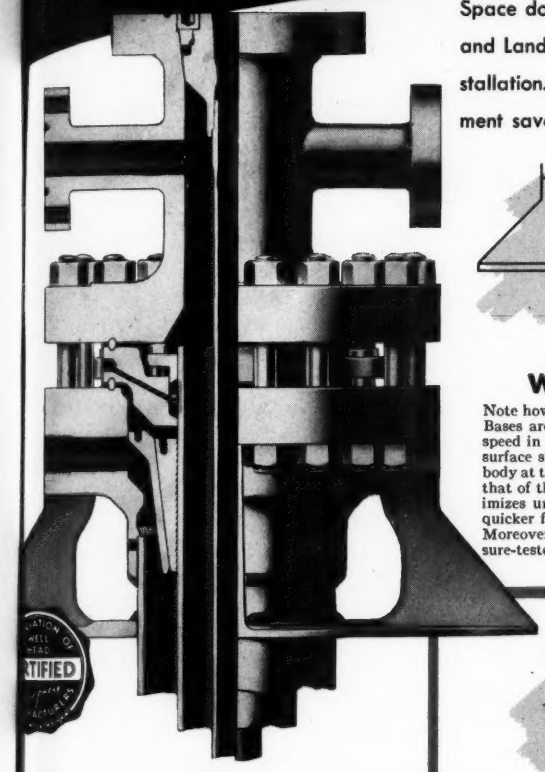
OUR 26th YEAR

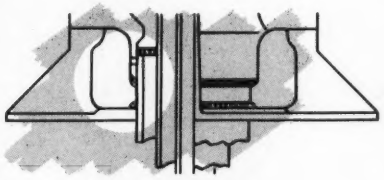
## *Simple, Easy Installation*

## ...one of SIX* casing head problems solved by Baash-Ross!

**Simplified Welding Operations... Unitized Slip Suspension... Unitized Pack-Off... A Few of Many Features That Simplify Installation!**

Space does not enable us to cover here the many ways that the new Baash-Ross Casing and Landing Heads have been engineered to assure maximum simplicity and ease of installation. However, here are a few highlights to show the multiple ways that this equipment saves crew time and speeds installation on all types of well-completion hookups.





### Simplified Welding Operations

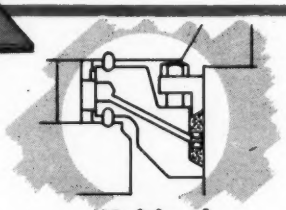
Note how the support ribs on Baash-Ross Landing Bases are cut out to permit maximum ease and speed in making a full-circumferential weld to the surface string. Also note how the thickness of the body at the weld point is approximately the same as that of the casing. This important advantage minimizes uneven heat flow and makes it easier and quicker for the welder to get a sound, tight weld. Moreover, the completed weld can be quickly pressure-tested for tightness before the welder leaves.

### Unitized Slip Suspension

All Slip Spiders are split for maximum speed in placing around the casing, and the Slip assemblies are hinged and unitized so that all segments *automatically* set at the same level to assure accurate centering of the pipe and uniform grip around the entire circumference of the casing. Saves time, assures better suspensions!

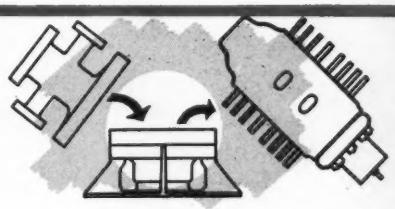
### Wide Choice of Installations

Still another important Baash-Ross feature is the unusually wide choice of installation methods and units available. Choice of three different types of Base Units—different types of interchangeable Packing Assemblies—of "Long" and "Short" Type Spool and Tubing Head Bodies—a wide range of Tubing Suspensions . . . all permit maximum simplicity in installing and maintaining a Baash-Ross Hook-up.



### Unitized Packing Assemblies

Baash-Ross Packing Assemblies are not installed piece-meal into the casing assembly, but are installed as a ***single complete unit*** that is simply placed in position and packed off against the casing. There are no exposed threads to become damaged and no welding is necessary to install the Packing Assembly. Pressure-tightness of the pack-off can be immediately tested before the installation crew leaves the rig!



### API Throughout

In Baash-Ross Well Control Equipment all flanges and outlets are API throughout. All flanges correspond to casing sizes stipulated by API flange schedules and receive *any* standard blow-out prevention equipment. No oversize or special prevention equipment is required during any phase of operations!

***THE OTHER FIVE**

**CELLAR-SAVING COMPACTNESS**
...that cuts over-all height to a minimum without sacrificing strength or safety of assembly!

**PERPETUAL PRESSURE CONTROL**
...quick plastic pack-off anytime without breaking connections or killing the well!

**PRE-TESTED PACK-OFF**
...all welds and pack-offs pressure-tested at time of in-

**WIDE-RANGE VERSATILITY**
...readily adaptable to any number casing strings—any type of tubing suspension:

**COMPLETE INTERCHANGEABILITY**
...hook-ups and suspensions readily interchanged. All fittings and dimensions API throughout!

And *simple installation* is only one of SIX major advancements incorporated into Baash-Ross Well Control Equipment. Get the full story from your nearest Baash-Ross representative . . . or write direct!

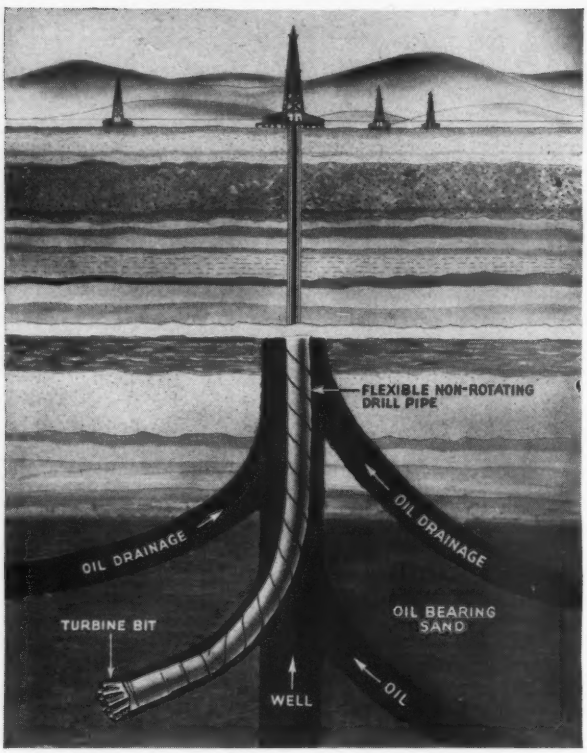
IT'S THE FOOTAGE OF HOLE IN THE OIL SAND THAT COUNTS

*They said:*

*"You can't drill an oil well*

**HORIZONTALLY"**

*— so Zublin does it!*




Extending far out into the oil sands, full size drain holes are drilled by the revolutionary, but simple, Zublin method. Any number of drill holes can be drilled outwardly from the vertical hole, in all directions—60, 70 or 80 feet from center. There's no danger of twist-offs. The drill pipe does not rotate. Hydraulic force operates the turbine bit which drills from vertical to horizontal position, at any depth. We are prepared to take full responsibility for drilling horizontal drain holes in your wells.

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*Inquiries for Franchises and Manufacturing Rights invited.*

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Zublin

**HORIZONTAL WELL DRILLING**

Kern County at 1525 ft. in fractured shale, showing oil. Anderson No. 1 in Sec. 31 is making hole ahead in shale at 1200 ft.

## Belridge Well Rigging To Pump

Wilshire Oil Co. is rigging pump to Lehman No. 1 in Sec. 18-28s-20e in the Belridge area of Kern County, after plugging back from a total depth of 1126 to 1038 ft. North of the Devils Den field, company's Kalloch No. 1 in Sec. 11-25s-18e has spudded.

## Lamont Project Cements Casing

In the Lamont area of Kern County, Tide Water Associated Oil Co. is drilling steadily ahead below 2400 ft., after cementing pipe at 867 ft. in Frick No. 22-16 in Sec. 16-31s-29e.

## Miramonte Job Still Inactive

Still inactive at 9434 ft., Pacific Western Oil Corp. and George F. Getty, Inc. probably will make no more hole in National Royalties No. 1 in Sec. 5-26s-22e, until necessary pipe is available.

## Hancock Oil Edison Driller

Hancock Oil Co. is drilling on down below 900 ft., after a stop to cement surface pipe at 506 ft. in Jobe Comm. No. 1 wildcat in Sec. 7-30s-29e near the Edison field.

## Trico Test Well Changes Owners

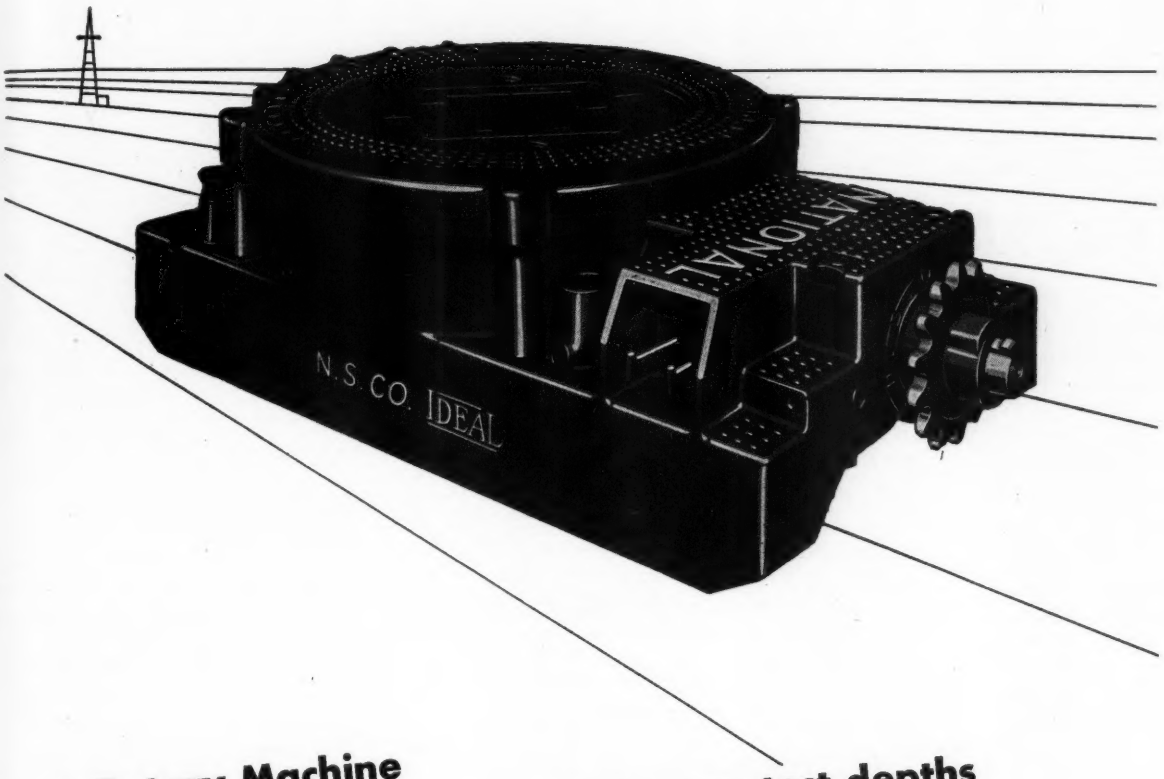
Trico Oil & Gas Co. has taken over the abandoned Tide Water Associated Oil Co.'s Fee No. 1 in Sec. 16-24s-23e in the Trico area and will deepen from present depth of 2540 ft. to the lower gas sand.

## Comanche Point Project Drills

With formation continuing to soften with depth, G. B. Finch Oil Co., Ltd., is drilling ahead below 3250 ft. in Tejon No. 6 in Sec. 32-12n-18w in the Comanche Point area of Kern County. Finch No. 2 in Sec. 7-24s-23e in the Trico area is shut in, with hole bottomed at 2571 ft.

# IDEAL SHS 20½

"Reg. U. S Pat. Off"




## A Rotary Machine for the highest speeds and the greatest depths

The SHS-20-½ provides many features developed from field research. Proven by actual field performance, this rotary has established many outstanding records and is most popular for superior high speed performance in deep well drilling.

*First in Quality* — THE NATIONAL SUPPLY COMPANY — NATIONAL BLUE PRODUCTS

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RIVER PLATE HOUSE, 12 SOUTH PLACE, LONDON, E. C. 2.

# Coastal and Northern District

## Conejo Wildcat Prospecting Ahead

Sandburg Petroleum Co. of Utah has resumed drilling in Janss No. 1 in Sec. 33-2n-19w in the Conejo area of Ventura County and last was reported making hole ahead slightly below 5200 ft. in lower Miocene. The try is located on the famous Janss ranch, breeding ground of many of the country's best thoroughbred horses. Primary objective is the Sespe, expected around 5400 ft.

## Patterson Try Being Deepened

After standing idle for four years, Don Pedro Oil Co. has returned to its No. 1 wildcat in Sec. 9-6s-9e in the Patterson area of Merced County and is carrying the hole ahead at 4167 ft. from old bottom at 4077 ft.

## Tehama Try Finds No Oil

With hole bottomed in hard black shale at 2569 ft., Northern Oil & Gas Co.'s Tiger No. 1 in Sec. 1-23n-7w in the Paskenta area of Tehama County, has reached the end of its exploratory journey. Nothing of petroleum value was reported uncovered.

In the Blossom area, Northern Counties Development Co. is drilling Brush Creek No. 1 in Sec. 30-27n-5w at 1930 ft.

## Los Alamos Test Standing Cemented

Whittier Associates' Barham No. 3 in Sec. 11-7n-32w in the Los Alamos area, Santa Barbara County, is standing with casing cemented on bottom at 2833 ft. A shale body encountered around 2650 ft., showed sub-commercial oil. Pipe was set to shut off the zone before drilling continued on down.

## Red Mountain Try Gets Deep

Continental Oil Co.'s Casitas No. 2 in Sec. 7-3n-23w in the Red Mountain area, Ventura County, is prospecting ahead near 8000 ft. Nothing of interest has been reported to date.

## Santa Paula Well Swabbing

Swabbing water with some gas was the latest report from the Oscar J. Smith, Analuf No. 7 in Sec. 214n-21w in the Santa Paula Creek area, Ventura County. The well is bottomed at 1320 ft.

## Rincon Project Interval Tests

C. C. M. O. Co.'s Hobson No. C-11 in Sec. 17-3n-24w in the Rincon field, which is bottomed at 14,155 ft., is testing at intervals.

## Gato Ridge Well Redrills

After redrilling its Arata No. 2 in Sec. 4-8n-32w in the Gato Ridge field of Santa Barbara County, Quincy Cass Associates is circulating hot oil. Original depth is 3460 and redrill depth 3360 ft. The Petrol Corp. has completed Tognazzini No. 52 at 3612 ft., pumping 447 barrels of 12 gravity oil a day.

## Santa Maria Job Swabbing

General Petroleum Corp., Aquistapace No. 2 is swabbing oil with the fluid level at 4110 ft. Total depth is 4264, plugged to 4215, with 8 5/8-inch casing cemented at 3492 ft.

## Orcutt Field Adds Producer

Pumping initially to sump 168 barrels of gross oil daily, Union Oil Co. has given the final touches to Newlove No. 52 in Sec. 25-9n-34w in the Orcutt field. Total depth is 3550 ft., with 7-inch pipe cemented at 2908 ft.

This lease was the scene recently of the traditional picnic and barbecue sponsored each year by coast division members of the company. This was the first time the picnic had been held since the Spring of 1941, at which time it was suspended until war's end. More than 1200 persons were in attendance.

## Butte County Project Spuds

In the Durham area of Butte County, Standard Oil Co. has started a search for gas in a drilling job known as Donohoe Fee No. 1 located in Sec. 6-20n-1e. Hole last was reported near 1000 ft.

## Eureka Test Grades Site

The Texas Co. is grading well site for its Holmes-Eureka No. 3 in Sec. 22-3n-1w in the Eureka area of Humboldt County.

## Sisquoc Well Site Staked

On the Rancho Sisquoc, Union Oil Co. has location staked for Sisquoc No. 6 in Sec. 25-9n-32w, Santa Barbara County. Escolle No. A-1 in Sec. 28-9n-34w in the Casmalia area is grading location.

## Bell-Casmite Offset Drills

Bell-Casmite Oil Co., which recently made a deep zone discovery in the old Casmalia field through the medium of Arellanes No. 2, is drilling Morganti No. 6, a southerly offset, at 3054 ft. The discovery well is pumping at the rate of 287 barrels of 22.6 gravity oil a day.

## Piru Job Reaming

After recovering fish, R. E. Havenstrite, Operator, is now reaming Lisk No. 1 wildcat in Sec. 15-5n-18w in the Piru area. Depth is 2818 ft.

## Ojai Well May Resume

Trans-Cal Gas & Oil Corp.'s Trans-Cal No. 1 in Sec. 12-4n-22w in the Ojai area, which has been idle some months at 1622 ft., may resume operations and deepen the hole for a more complete test of production possibilities at that location.

## Kirby Hills Test Started

Standard Oil Co., which recently completed Kirby Comm. No. 1 in the Kirby Hills area of Solano County for more than 4,000,000 feet of gas daily, is drilling No. 3 in Sec. 24-4n-1w at 1069 ft. The area, which was opened up by Shell Oil Co. is

about nine miles southeast of Fairfield and not far from the extensive Rio Vista gas field.

### Corning Explorer In Cretaceous

Superior Oil Co. is preparing to gun-perforate Russell No. 1 in Sec. 12-24n-3w in the Corning area, Tehama County, after cementing pipe on bottom at 1716 ft. The Cretaceous was topped at 1692 ft.

### South Mountain Try Makes Hole

F. E. Fairfield last was reported making progress with the drill at 4061 ft. in West Mountain No. 1 in Sec. 23-3n-21w in the South Mountain area, Ventura County. Ground is being graded for D. D. Feldman's Richardson No. 1 in Sec. 14.

### Piru Venture Repairing

In the Piru area, C. W. Ginter & Associates is repairing equipment on Warring No. 1 test in Sec. 19-4n-18w. Present bottom is 2652 ft.

### San Ardo Try Fishing Pipe

The wildcat campaign of C. C. M. O. Co. in the San Ardo area of Monterey County has been interrupted by a fishing job. A twist off left about 75 ft. of pipe, drill collar and bit in the hole. Total depth is 2425 ft., with top of fish near 2345 ft. The try, located in Sec. 6-23s-10e, is known as San Ardo No. 6-01. Bayside Development Co. has abandoned Vierra No. 1 in Sec. 7-13s-23e at Moss Landing. Total depth is 7926 ft.

### Trico Test Completing

Trico Oil & Gas Co. is giving the finishing touches to its Pizzotti No. 1 in Sec. 7-24s-23e in the Trico area of Tulare County, after gun-perforating the interval of 3170-3250 ft. On test of the gun-ferforated interval between 3260 and 3290 ft., the well blew at the rate of 6,250,000 cubic ft. of gas a day on test.

In a portion of the Trico area in Kings County, the company is rigging derrick for Chilbers Comm. No. 1 in Sec. 12-24s-22e.

### Standard to Construct New Laboratory in So. Calif.

Proposed construction this year of a production-technology laboratory in Southern California for its producing operations was announced recently by Standard of California.

The new laboratories are to be built adjacent to the Murphy-Coyote field, about four miles northwest of Fullerton, and will include five laboratory units and a group of offices. The building will replace temporary structures in which research and administrative work is now being done.

Contractor's bids are due on May 27, and Standard engineers anticipate that construction will begin early in June. It is expected that the new building will require seven months to complete.

The laboratories will be used primarily for study of drilling operation methods and problems related to recovery of crude oil in established fields.

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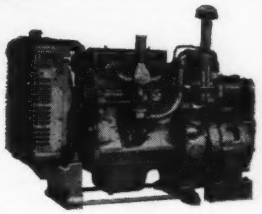
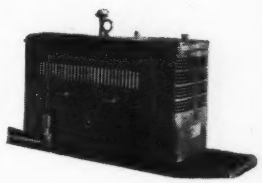
have a built-in safety feature—the Palmer Self-Regulating Alternator, which holds its voltage from no load to full load within 2% plus or minus at unity power factor, has high starting torque and high efficiency (will carry 25% overload 4 hours without overheating), and requires neither voltage regulators or switchboards. Electric motors can be started up to full rating of alternators. For International-Palmers, with skid bases and hoods, call —





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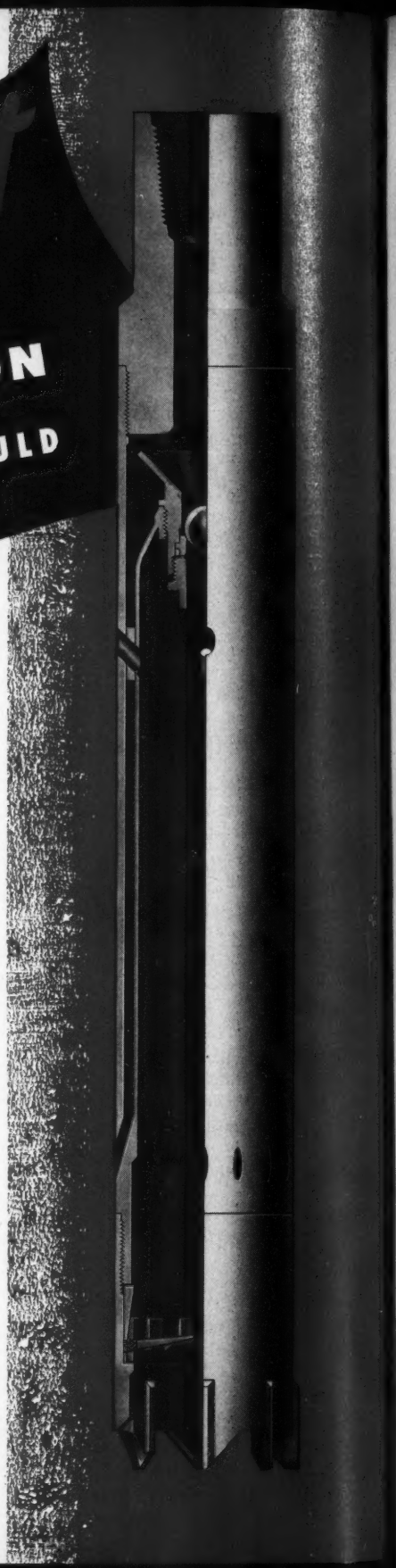
## THIS BOWEN JUNK BASKET SHOULD BE ON EVERY DRILLING RIG!



**EVERY OPERATOR KNOWS the vital importance of "on the spot" protection for his drilling well. He can't afford to risk his investment without it!**

**That's why the Bowen Junk Basket is a handy tool to have on your rig while drilling. It's instantly ready to run in to pick up lost bit cones, tong pins, hammers, mill cuttings and similar junk . . . to straighten a hole at point of drift . . . or to recover a core!**

### REVERSES FLUID FLOW

**Unlike ordinary junk baskets, the Bowen uses reverse circulation to *pull* objects into the basket—not force them away. Circulating fluid is diverted outwardly and downwardly through side passages in the barrel and against the full circumference of the hole. Here it is deflected in a manner that pushes all objects toward center. Fluid flows in a continuous stream to the center of the tool and up through it to return ports, giving a reverse circulation action without disturbing regular circulation in the well. *Moreover, full pump pressure can be utilized*—a feature that's exclusive with the Bowen Junk Basket—because there's no danger of pressure bearing against and causing loss of the fish!**

**In addition to junk recovery, the Bowen Junk Basket is widely used as a hole straightener and for coring purposes. It's available in sizes from 4⅝" to 17½", and is engineered to recover all types of bit cones within its various size ranges. For details—call the Bowen Service Store in your territory. Twenty-four hour service in all active California fields!**

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## Petroleum Outlook for 1946

According to the Economics Advisory Committee of the Interstate Oil Compact Commission, the U. S. oil industry faces the unusual experience in 1946 of a sharp decline in demand. Total anticipated requirements of about 4,800,000 barrels daily will be about 10 percent less than in 1945. This will be the largest decline in the history of the industry, exceeding the decrease of 9 percent in 1932. Except for the depression years of 1930-32, petroleum consumption has decreased in only three years in the past quarter century — 1921, 1938, 1942 — and then only by 1 or 2 percent. The industry is so accustomed to steadily expanding volume that a decline of the magnitude indicated for the next year presents difficult problems, the report declares.

The probable output of crude oil required to balance demands in 1946 will be about 4,150,000 barrels daily, representing a decrease of over 500,000 or 11 percent. The difference between the production peak of 4,890,000 in July, 1945, and the low point of about 4,200,000 early in 1946 will result in a maximum range of about 700,000 barrels daily or 15 percent. Since this change will probably be concentrated to a large extent on the areas that were called upon to supply so much of the additional oil for war, the greatest shock will be felt in Texas and California. The problem is a general one, however, and producers of all states should be forewarned of the decline that will occur in requirements for crude oil, the committee feels.

Lower production in 1946 will mean a sharp increase in the unit cost of producing crude oil. During the war, rising costs for labor and materials were substantially offset by larger volume, so that the usual accounting methods reflected only a moderate increase in cost per barrel. The sharp decline in volume next year, together with advancing wage rates, will exert a cumulative influence to bring about much higher unit costs of production than indicated for 1944-45. This development and the high replacement cost being experienced generally throughout the industry provide convincing proof of the need for an increase in ceiling price on crude oil or refined products, or complete removal of such ceilings at an early date, so that normal economic forces may be allowed to determine price levels conducive to the sound functioning of the industry in the future, it was explained.

The year 1946, the committee believes, will mark the difficult phase of the post war transition for the oil industry. Unless some unusual cir-

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•

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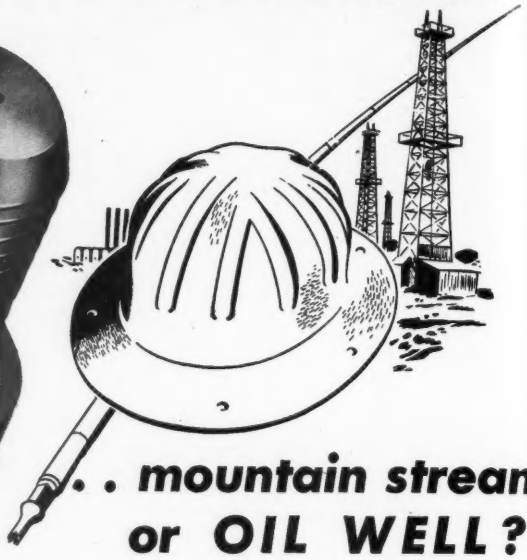
# There's Fishing *and* FISHING!



## . . . mountain stream or OIL WELL?

There is no better sport than fishing in some clear tumbling mountain stream . . . Conversely there is nothing quite so disheartening to the oil men as "fishing" for a broken string because a sucker rod has not been able to "take it." . . . If you use *Axelson Sucker Rods,* you will keep down-time, through rod failure, at the irreducible minimum . . . Because Axelson Sucker Rods are made of supreme bar stock and from end to end they are scientifically heat treated . . . the pin end forging, perfect thread alignment, and shot peening to fight off corrosion, give maximum strength, ductility and shock resistance.

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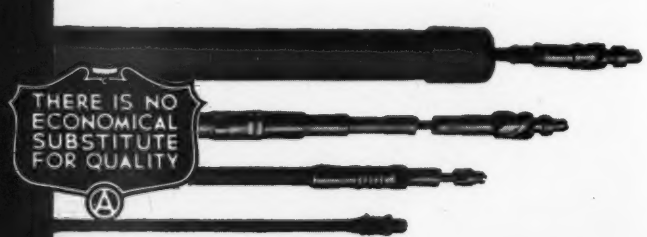

cumstances arise, it is anticipated that the upward trend in petroleum demand will be resumed in 1947 and continue at a moderate rate for several years thereafter.

## La Mirada Test Location Staked

Approximately three-quarters of a mile northwest of General Petroleum's Librown No. 1 well, which was completed a year ago, the company has staked location for La Mirada Comm. No. 46-1 in Sec. 16-3s-11w in the La Mirada area of Los Angeles County. A number of wells already has been drilled in the general terrain. All of shown production, but in view of the extreme bottom-hole depth, they were not considered profitable from a commercial standpoint. Oil sands previously found are generally thick enough to encourage further prospecting.

## Pacific Gulf Drill Program

Pacific Gulf Oil Co. (J. H. Beach and G. W. and W. H. Allingham) has plans outlined for two exploratory projects in San Joaquin Valley area. One will test 160 acres in Sec. 30-28s-29e in the Round Mountain area. The other will prospect on a 600-acre lease in Sec. 30-28s-23e in the Goose Lake area, two miles south of Buttonwillow.

## Seaboard Active In Valley Areas

Seaboard Oil Co.'s SWUM-BVA No. 73-14 in Sec. 14-32s-25e in the Buena Vista Lake area is standing cemented with casing set at 7494 ft., after redrilling to 7502 ft. Original depth is 11,495 ft.

In the Buttonwillow area, Arlington Prop. Corp., No. 12-6 in Sec. 6-28s-23e is fishing for stuck drill pipe at 4820 ft. Total depth is 4832 ft. Corehole No. 5 in Sec. 16-17s-14e in the Cantua Creek area, Fresno County, is coring at 3125 ft.

## Dyer Creek Try Planned

Pacific Oil & Gas Development Corp., San Francisco, is planning to drill a wildcat test in the Dyer Creek area, where commercial production thus far has proved extremely elusive. James P. George is president of the company, and B. B. Ellis, vice president and field manager.


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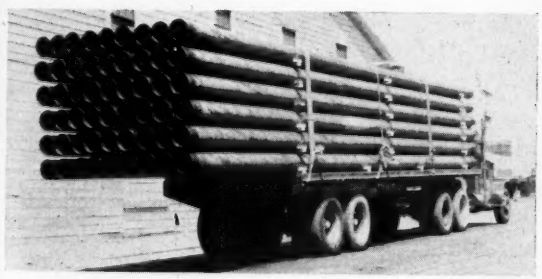

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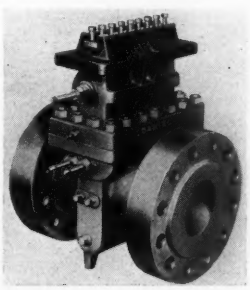

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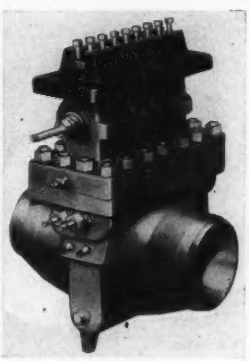

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Tret-O-lite

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46-E

# THIS LAUGH

# OFF!!

A new father was looking over the babies through the big plate-glass window in the infant ward. Every baby there, it seemed, was crying.

"What's the matter in there?" he asked the nurse.

"If you were only a few days old, out of a job, and owed the government $2,050, you'd be bawling, too," the pretty nurse replied.

---

Rastus: "You ain't yo self no more. Sick or sumpin'?"

Mose: "Got insomnia. Keep wakin' up every few days."

---

A Harvard man enlisted in the United States Army as a private. He had been in service only a few weeks when his captain posted a notice on the bulletin board. The Harvard man read it and sniffed.

"It is pretty hard," he told another soldier, "to take orders from a man who knows no better than to end a sentence with a preposition."

The captain overheard him. Next day the bulletin carried this notice: "There is in this company a certain amount of insubordination up with which I shall no longer put."

---

She paints,
She powders,
She reads risque stories.
She drinks my liquor
She cusses, too,
She eats lobsters at midnight,
She does lots of things she oughtn't to,
But dammit . . . she's my grandmother and I love her.

---

Having imbibed too freely at a hotel dance a pretty young thing in Texas ran out of doors, fainted and fell over a trash barrel.

A young lieutenant saw her fall, picked her up and carried her up to his room. The next morning he wired his partner in New York:

"Close office. Sell everything. Come to Texas. They throw away better stuff here than you can buy in New York."

---

"Do you prefer Scotch?" asked the genial host as we arrived at the party.

"Yes, Sir!" we replied enthusiastically.

"So do we," answered the host as he mixed us a Bourbon highball.

---

"My good woman," said the doctor after a thorough examination of the feminine patient, "there's only one thing wrong with you . . . you are going to have a baby."

"But, doctor, that's not possible . . . I'm not even married. I don't know anything about having babies, I've led a very sheltered life."

"Nevertheless, it's going to happen," said the doctor.

"Oh, my," said the patient with a sudden light in her eyes, "that dirty air raid warden. He told me that was artificial respiration."

---

A young soldier in Japan with the army of occupation became enamored of a native chick. He wrote home and told his family all about her beauty, intelligence, charm, poise, cooking ability and so forth. He asked his parents what they thought about him making her his bride.

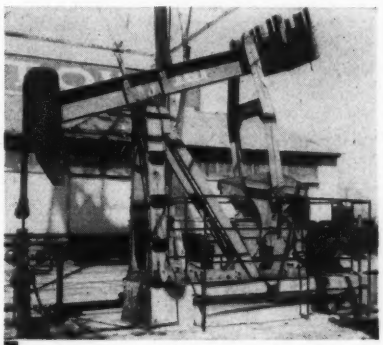
The parents wrote back that she sounded all right to them but he had overlooked one point; he had neglected to ascertain the politics of the girl.

Eventually came another letter back from Japan containing the following paragraph on the politics of the bride:

"We never have discussed politics directly but just last night she and I were on the divan and she kept repeating: 'No Dewey! No Dewey!' So I guess she's a Democrat."

Captain: Seaman Jones, it gives me great pleasure to give you these two stripes.

Seaman: Why not give me three, sir, and really enjoy yourself?

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# California Oil World's Monthly Summary

## DEVELOPMENT—PRODUCTION—SUPPLY & DEMAND
## PACIFIC COAST TERRITORY
## TABLE I—CALIFORNIA DEVELOPMENT—PRODUCTION

| | MARCH, 1946 DEVELOPMENT | | | | PRODUCTION | |
|---|---|---|---|---|---|---|
| | Active Drilling Wells | Oil Wells Completed | Initial Production B/D | Oil Wells Completed First 3 Months | Daily Average March 1946 | Daily Average March 1945 |
| **SAN JOAQUIN VALLEY** | | | | | | |
| Ant Hill | 1 | 3 | 225 | 6 | 1,277 | 314 |
| Antelope Hills | ..... | ..... | ..... | ..... | 1,645 | 2,020 |
| Antelope Plains | ..... | ..... | ..... | ..... | ..... | 27 |
| Arvin | ..... | ..... | ..... | ..... | 12 | 30 |
| Bellevue | ..... | ..... | ..... | ..... | 419 | 523 |
| Belridge—North | ..... | ..... | ..... | ..... | 5,786 | 7,379 |
| Belridge—South | 4 | 6 | 98 | 22 | 10,955 | 13,034 |
| Blackwell's Corner | ..... | ..... | ..... | ..... | 213 | 173 |
| Brundage | ..... | ..... | ..... | ..... | ..... | ..... |
| Buena Vista Hills | 2 | 4 | 1,955 | 6 | 40,103 | 38,228 |
| Burrel | ..... | ..... | ..... | ..... | 14 | 50 |
| Canal | ..... | ..... | ..... | ..... | 2,864 | 3,557 |
| Canfield-Gosford | ..... | ..... | ..... | ..... | 45 | 21 |
| Canfield Ranch | ..... | ..... | ..... | ..... | 27 | 31 |
| Coalinga—East | ..... | 1 | 225 | 4 | 17,901 | 21,682 |
| Coalinga—Nose | 1 | ..... | ..... | ..... | 56,029 | 59,572 |
| Coalinga—West | ..... | ..... | ..... | ..... | 6,909 | 8,384 |
| Coles Levee—North | 2 | 1 | 340 | 2 | 15,190 | 14,310 |
| Coles Levee—South | ..... | ..... | ..... | 1 | 1,874 | 2,616 |
| Cymric | 2 | 11 | 2,207 | 18 | 5,563 | ..... |
| Edison | 9 | 12 | 5,733 | 29 | 14,176 | 4,234 |
| Elk Hills | 7 | 3 | 816 | 6 | 14,669 | 59,554 |
| Fruitvale | ..... | ..... | ..... | ..... | 7,974 | 8,588 |
| Greeley | ..... | 1 | 602 | 3 | 10,257 | 13,777 |
| Helm | 4 | 2 | 385 | 9 | 3,957 | 2,758 |
| Jacalitos | 1 | 2 | 464 | 4 | 4,906 | 2,371 |
| Kern Front | 2 | 2 | 71 | 10 | 12,674 | 13,073 |
| Kern River | 3 | ..... | ..... | 3 | 9,921 | 9,595 |
| Kettleman North Dome | 6 | 2 | 480 | 6 | 38,717 | 39,412 |
| Lanare | 4 | 3 | 413 | 6 | 1,472 | 144 |
| Lost Hills | ..... | 1 | 36 | 8 | 3,584 | 3,348 |
| McClung | ..... | ..... | ..... | ..... | 32 | 108 |
| McKittrick | ..... | 1 | 12 | 1 | 4,717 | 5,067 |
| Midway-Sunset | 8 | 2 | 52 | 7 | 37,442 | 39,866 |
| Mountain View | ..... | ..... | ..... | 2 | 3,242 | 2,822 |
| Mount Poso | ..... | ..... | ..... | 9 | 16,924 | 18,542 |
| Paloma | 7 | 2 | 1,169 | 5 | 5,007 | 979 |
| Pleasant Valley | ..... | 1 | 643 | 1 | 3,754 | 3,250 |
| Pyramid Hills | ..... | ..... | ..... | 1 | 381 | 383 |
| Race Track | 2 | 1 | 750 | 2 | 1,226 | 36 |
| Raisin City | 3 | ..... | ..... | ..... | 2,657 | 3,671 |
| Rio Bravo | ..... | ..... | ..... | ..... | 13,650 | 16,122 |
| Riverdale | 1 | 1 | 297 | 2 | 3,394 | 4,468 |
| Rosedale Ranch | ..... | ..... | ..... | ..... | 88 | ..... |
| Round Mountain | ..... | ..... | ..... | 1 | 9,309 | 9,390 |
| Santiago | 2 | 5 | 3,891 | 11 | 4,027 | ..... |
| Sheep Springs | 1 | 1 | 1,500 | 2 | 681 | 467 |
| Strand—East | ..... | ..... | ..... | ..... | 571 | 762 |
| Strand—West | ..... | ..... | ..... | ..... | 1,874 | 1,516 |
| Tejon | 4 | 3 | 127 | 11 | 1,204 | 379 |
| Ten Section | ..... | ..... | ..... | ..... | 9,003 | 11,816 |
| Union Avenue | ..... | ..... | ..... | ..... | 237 | 34 |
| Wasco | ..... | ..... | ..... | ..... | 882 | 1,405 |
| Wheeler Ridge | ..... | ..... | ..... | ..... | 226 | 226 |
| Miscellaneous | 3 | ..... | ..... | ..... | 60 | 23 |
| TOTAL SAN JOAQUIN VALLEY | 79 | 71 | 22,491 | 198 | 409,721 | 450,137 |
| **COASTAL AREA** | | | | | | |
| Aliso Canyon | ..... | 1 | 216 | 3 | 2,900 | 3,092 |
| Bradley Canyon | ..... | ..... | ..... | ..... | ..... | 112 |
| Capitan | 1 | ..... | ..... | 3 | 3,483 | 2,567 |
| Del Valle | 1 | 1 | 175 | 1 | 2,510 | 1,771 |
| Elwood | 2 | ..... | ..... | 1 | 6,198 | 5,905 |
| Gato Ridge | 2 | ..... | ..... | ..... | 3,846 | 4,209 |
| Hasley Canyon | ..... | ..... | ..... | ..... | ..... | ..... |
| Newhall-Potrero | 3 | 1 | 92 | 2 | 5,732 | 5,412 |
| Oak Canyon | ..... | ..... | ..... | 1 | 1,898 | 1,970 |
| Oxnard | ..... | ..... | ..... | ..... | 1,074 | 1,262 |
| Padre Canyon | ..... | 1 | 985 | 2 | 2,540 | 1,774 |
| Ramona | ..... | 2 | 179 | 7 | 645 | ..... |
| Rincon | 1 | ..... | ..... | ..... | 4,734 | 4,432 |
| San Martinez | ..... | ..... | ..... | ..... | 3,058 | 3,162 |
| San Miguelito | 1 | ..... | ..... | 2 | 4,669 | 5,860 |
| Santa Barbara | ..... | ..... | ..... | ..... | 88 | 40 |

| | MARCH, 1946 DEVELOPMENT | | | | PRODUCTION | |
|---|---|---|---|---|---|---|
| | Active Drilling Wells | Oil Wells Completed | Initial Production B/D | Oil Wells Completed First 3 Months | Daily Average March 1946 | Daily Average March 1945 |
| **MONTHLY SUMMARY—Continued** | | | | | | |
| Santa Maria | 4 | 3 | 581 | 5 | 12,780 | 13,658 |
| Santa Maria Valley | 4 | 3 | 511 | 13 | 34,759 | 37,081 |
| Summerland | ..... | ..... | ..... | ..... | 8 | 5 |
| Ventura Avenue | 10 | 5 | 1,445 | 9 | 46,774 | 49,227 |
| Ventura-Newhall | 4 | 1 | 153 | 5 | 6,551 | 5,910 |
| Watsonville | ..... | ..... | ..... | ..... | 25 | 25 |
| Zaca Creek | ..... | ..... | ..... | ..... | 391 | ..... |
| Miscellaneous | ..... | ..... | ..... | ..... | ..... | ..... |
| TOTAL COASTAL AREA | 33 | 18 | 4,337 | 54 | 144,663 | 147,474 |
| **LOS ANGELES BASIN** | | | | | | |
| Brea-Olinda | ..... | 2 | 86 | 2 | 10,641 | 18,859 |
| Buena Park | ..... | ..... | ..... | ..... | 72 | 116 |
| Coyote—East | ..... | 2 | 117 | 3 | 4,817 | 5,150 |
| Coyote—West | 1 | 2 | 875 | 3 | 15,527 | 12,474 |
| Dominguez | 1 | ..... | ..... | 2 | 16,974 | 19,149 |
| East Los Angeles | 1 | ..... | ..... | 2 | 473 | ..... |
| El Segundo | ..... | ..... | ..... | ..... | 591 | 798 |
| Huntington Beach | 7 | 5 | 546 | 11 | 46,030 | 49,333 |
| Inglewood | ..... | ..... | ..... | ..... | 13,330 | 16,224 |
| La Mirada | ..... | ..... | ..... | 1 | 92 | ..... |
| Lawndale | ..... | ..... | ..... | ..... | 20 | 27 |
| Leffingwell | ..... | ..... | ..... | 1 | 15 | ..... |
| Long Beach | ..... | ..... | ..... | 1 | 25,541 | 27,986 |
| Los Angeles-Salt Lake | ..... | ..... | ..... | ..... | 350 | 458 |
| Montebello | 1 | ..... | ..... | 2 | 9,166 | 10,440 |
| Newport-Costa Mesa | 2 | 5 | 532 | 17 | 3,648 | 44 |
| Playa Del Rey | ..... | ..... | ..... | ..... | 2,438 | 2,516 |
| Potrero | ..... | ..... | ..... | 1 | 1,034 | 801 |
| Richfield | 1 | 1 | 12 | 3 | 7,394 | 7,264 |
| Rosecrans | 1 | 1 | 22 | 1 | 5,143 | 5,795 |
| Sansinena | ..... | ..... | ..... | ..... | 90 | ..... |
| Santa Fe Springs | ..... | ..... | ..... | ..... | 16,684 | 17,756 |
| Seal Beach | 5 | 2 | 1,731 | 4 | 10,345 | 8,576 |
| Torrance | 1 | 1 | 29 | 7 | 8,869 | 8,748 |
| Turnbull Canyon | ..... | ..... | ..... | ..... | 145 | 196 |
| Whittier | ..... | ..... | ..... | ..... | 1,046 | 1,008 |
| Wilmington | 16 | 13 | 1,993 | 42 | 97,386 | 98,845 |
| Yorba Linda | ..... | ..... | ..... | ..... | ..... | 686 |
| Miscellaneous | ..... | ..... | ..... | ..... | ..... | ..... |
| TOTAL LOS ANGELES BASIN | 37 | 34 | 5,943 | 103 | 297,861 | 306,249 |
| **EXPLORATORY** | | | | | | |
| Outpost Wells | 24 | ..... | ..... | ..... | ..... | ..... |
| Wildcats | 14 | ..... | ..... | ..... | ..... | ..... |
| Gas Wells | 6 | 1 | Gas | 10 | ..... | ..... |
| TOTAL CALIFORNIA | 193 | 124 | 32,771 | 456* | 852,245 | 903,860 |

*—Includes gas wells completed and 91 drilling wells abandoned.

## TABLE II—SUPPLY AND DEMAND FOR PETROLEUM PRODUCTS
## PACIFIC COAST TERRITORY
## DATA FOR MARCH OF EACH YEAR

| | March 1941 | March 1942 | March 1943 | March 1944 | March 1945 | March 1946 |
|---|---|---|---|---|---|---|
| **RAW MATERIAL—B/D** | | | | | | |
| 1. Crude Oil Produced—California | 609,774 | 607,325 | 776,460 | 827,966 | 903,860 | 852,245 |
| 2. Crude Oil from outside 5 Western States | 2,032 | 4,288 | 4,218 | 4,550 | 18,366 | 4,174 |
| 3. Natural Gasoline Produced | 37,000 | 33,000 | 37,000 | 40,000 | 42,000 | 41,000 |
| **SUPPLY OF FINISHED PRODUCTS** | | | | | | |
| **ALL SOURCES—B/D** | | | | | | |
| 4. Natural Gas., L.P.G. & Condensate | 1,935 | 10,484 | 14,064 | 11,161 | 16,323 | 18,161 |
| 5. Gasoline and Naphtha Distillates | 222,774 | 235,226 | 245,129 | 309,645 | 337,645 | 286,935 |
| 6. Kerosene and Kerosene Distillates | 7,742 | 4,226 | 10,935 | 11,097 | 7,516 | 13,678 |
| 7. Lubricating Oils, etc. | 10,290 | 10,710 | 13,871 | 10,677 | 12,033 | 12,194 |
| 8. Gas Oil and Diesel Oil | 76,548 | 63,613 | 82,000 | 59,903 | 78,613 | 110,839 |
| 9. Fuel Oil Residuum | 236,806 | 267,839 | 378,580 | 470,000 | 459,000 | 411,355 |
| 10. Asphalt and Road Oils | 12,194 | 23,355 | 17,097 | 19,129 | 17,323 | 13,388 |
| 11. Coke and Other Finished Products | 3,064 | 1,581 | 807 | 2,452 | 6,548 | 3,871 |
| 12. Other Unfinished Oils | 2,645 | 420 | (6,742) | (15,516) | 323 | 1,387 |
| 13. Refinery Shortage & Gas | 24,453 | 24,676 | 32,387 | 41,194 | 52,741 | 31,644 |
| 14. Crude Oil (Net) | 63,580 | 14,774 | 46,290 | (21,322) | 16,419 | 20,742 |
| 15. TOTAL SUPPLY | 656,741 | 656,904 | 834,418 | 898,420 | 1,004,484 | 924,194 |
| 16. TOTAL DEMAND | 680,419 | 717,481 | 869,096 | 1,017,968 | 1,068,449 | 961,517 |
| 17. DIFFERENCE | (23,678) | (60,577) | (34,678) | (119,548) | (63,965) | (37,323) |
| 18. Stocks on hand End of each month (Total Bbls.) | 149,804,000 | 140,655,000 | 130,747,000 | 89,739,000 | 81,051,000 | 73,100,000 |

# EXPANSION...

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West-Hitchcock Corporation, Klamath Falls

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Southern Garage, Bakersfield
Cochran and Nichols, Ontario
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Sawyer Motor Comapny, Long Beach
Connell Motor Truck Company, Stockton
Fresno Trailer Company, Fresno
Henwood Motor Company, San Jose
P. E. Van Pelt, Oakdale
Routzan White Truck Sales, Oakland

**IDAHO**
Logsdon Motor Company, Boise

**UTAH**
Lindner and Wood, Salt Lake City

**MONTANA**
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The increasing demand of truck owners everywhere for White Super Power . . . based on its extra performance, dependability and low cost maintenance over tremendously high mileages . . . has created the need for an expansion of production facilities and a program is underway to double White's output of trucks and busses.

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# C.N.G.A. June Frolic

CNGA June Frolickers will have the best of food and service this year, reports George Tyler, hard working CNGA secretary, after making an inspection of the staff and facilities of the Rio Hondo Golf Club where the event will be held Saturday, June 8th. George had a busy day as you can see from these pictures. First, he took off his coat and leaned heavily on a shovel while Bill Bryant (Rio Hondo Club manager) laid the corner stone for the new barbecue pit addition, in which Bill's famous Mexican chef will prepare the meat to be served.

After looking at the Club's wide, shady veranda, where Bill promises to have a plentiful supply of comfortable seats, George inspected the Club's staff.

Following his inspection of the Club and tired, but happy, George drove back to town looking forward to a quiet evening at home with a good book. Poor George! At the office he found Earl Brock, CNGA Entertainment Chairman, and producer Ken Harlan waiting for him. They insisted that he accompany them on a tour of the night spots to select acts for the big Frolic show.

Ever willing to serve CNGA, George regretfully cancelled the date with the book and set out with Earl and Ken. Our cameraman caught a picture of George relaxing, bored with it all, and longing to be alone with that book.

The show which Ken and his two helpers have lined up is a honey. It will climax a big day time program of sports and games, including golf, paddle tennis, horseshoes and base ball, arranged by Brock and the entertainment committee. The committee, Brock says, has pledged itself to do its best to make each Frolicker feel that he has been "King for a day".

In view of all this, George Tyler is advising all prospective Frolickers to get their tickets early. The price is $4 and checks should be mailed to Tyler at the CNGA office, 510 W. 6th St., Los Angeles 14.

## Death Takes Roy Somers

Roy Somers, Assistant Secretary and Assistant Treasurer of the Petroleum Equipment Company, subsidiary of Bethlehem Steel Corporation, died May 14, 1946. Death came suddenly to Mr. Somers, only a few hours after he was stricken while with a company of his associates at the Los Angeles Athletic Club.

1880-1946

Born in San Francisco in 1880, of pioneer California stock, Roy Somers' early life was spent in and around that community. He graduated from the University of California in the class of 1904, but it was not until 1923 that he came to Los Angeles. Here, in 1924, he joined the Petroleum Equipment Company, which was at that time in its infancy. Since then, Mr. Somers has been one of the principal stockholders of this company and an active contributor to its substantial growth and standing in the oil industry of California. When Petroleum Equipment Company was purchased by the Bethlehem Steel Corporation last year, Mr. Somers remained with the company as an active officer, up until his death.

He is survived by his wife, Louise Somers; a son, Harvey Somers of Los Angeles; a daughter, Mrs. James Roland Lowe of Grand Rapids, Michigan; a sister, Mrs. A. A. Fisher of Washington, D. C., and three grandchildren.

Mr. Somers was a member of the Bohemian Club of San Francisco, the Los Angeles Athletic Club and the Wilshire Country Club of this city.

Roy Somers' sudden death is a great shock to his business associates and friends, whose respect he had maintained by his high principles, ideals, and sincerity.

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## Charles Grasla Passes Away

Charles Lester Grasla passed away suddenly May 4, 1946, at his home in Alhambra, of a heart attack.

In 1919, he was associated with G. W. Schweinhard in the Lucey Manufacturing Company, Los Angeles, by whom they were both employed. When Mr. Schweinhard founded Petroleum Equipment Company in 1922, Charley went along as a one-man office staff. Down through twenty-four years he efficiently headed up Petroleum Equipment Company's order department.

Charley, as he was affectionately known, had to a marked degree the gift of "phone friendliness", as attested by scores of warm friends, many of whom he never saw face to face. He was one of the rapidly dwindling breed of supply men who could discuss with equal facility and accuracy the requirements of equipment and supplies for either "tools" or "rotary."

Charles Grasla

His loss is a heavy one to his associates in the company he served so long and well, and to his host of friends in the oil industry.

## Physical Constants of Hydrocarbons

Volume III of Egloff's **Physical Constants of Hydrocarbons** (Reinhold—661 pp—$15) brings to the technologist an exhaustive compilation of constants data covering the mononuclear aromatic hydrocarbons. The book appears as No. 78 of the American Chemical Society's Monograph Series.

The values tabulated were collected from the literature and unpublished data from the Universal Oil Products Company, and other research laboratories. The constants recorded are: melting points at all given pressures, boiling points at all pressures, densities at all temperatures, refractive indices of the sodium D, hydrogen and helium lines at all temperatures, critical temperatures, critical pressures, critical densities, sublimation points, selected melting ranges and boiling points. A good history of the benzene ring is given together with a satisfactory discussion of the clarification of some features of aromatic behavior since the use of the resonance concept.

The twenty-five chapters are well arranged; and complete bibliographies from which the data were obtained for each hydrocarbon, or hydrocarbon group, are given at the end of each section. This book belongs on the desk of every petroleum technologist and research worker.

---

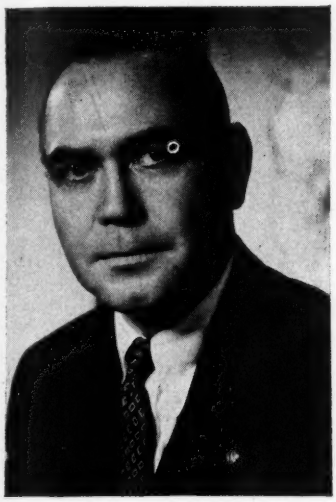
## Portals Well Flowing Crude

L. S. Gilmour & Associates has completed Long No. 1 in Sec. 6-30s-29e in the Portals area, Kern County, flowing at the rate of 95 barrels of 19.4 gravity oil a day through a 16/64-inch bean. The well is bottomed at 4754 ft.

Neff No. 2 in the section is cleaning out, after redrilled to 4749 ft. Total depth is 4798 ft. Tejon No. 1 in Sec. 36-32s-29e in the Tejon area is an abandonment at 2445 ft. in granite.

## R. W. McClenahan Advanced to Vice-Presidency

American Meter Company has announced the election of Col. R. W. McClenahan as a Vice-President of the Company, effective as of April 17, 1946.



**Col. R. W. McClenahan**

Col. McClenahan returned to the Company after his discharge from the U. S. Army Air Forces in November 1945. He has been active since that time working on special assignments for the Company.

Granted a leave of absence from his duties as manager of the Philadelphia Company since February 1st, 1926, he was commissioned a Major in March 1942, was promoted to Lt. Colonel on September 1, 1942 and to Colonel on April 3, 1943. He went overseas on May 18, 1942 where he served as assistant Chief of Staff to the Commanding General, U. S. Army Air Forces, Middle East; later was made assistant Chief of Staff, 9th Air Force with headquarters at Cairo. In January of 1944 he was transferred to England as assistant Chief of Staff to Commanding General, 9th Tactical Air Command. He participated in the planning and execution of air support for the Normandy invasion, and in close support of the 1st U. S. Army.

In January of 1945 Col. McClenahan was transferred to headquarters U. S. Army Air Forces Intelligence Division at Washington, D. C.

During his overseas service he participated in the following campaigns: Libya, Tunisia, Sicily, Italy, Air Invasion of Europe, Normandy, France, Rhineland and Ardennes.

He has been decorated with the Legion of Merit, Bronze Star and the Order of British Empire.

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## W. N. Lacey of Caltech Gets Hanlon Award

How to Safely, Economically and Advantageously Utilize Electric Power in Natural Gasoline Plant Operations was the subject of the paper presented at the May meeting of the California Natural Gasoline Association by Harold S. Davis, General Electric Company engineer.

Using a typical absorption plant of 150-350 installed horsepower as an example, Mr. Davis discussed the problem of designing a power distribution system and selecting the electrical equipment and machinery for the plant. The advantages and relative costs of possible alternate systems and selections were discussed.

**Dr. W. N. Lacey**

Preceding Mr. Davis' paper, Dr. Wm. N. Lacey, this year's Hanlon Award recipient, was presented with the gold watch and chain which are emblematic of the Award. The Hanlon Award, sponsored by the Natural Gasoline Association of America, is for meritorious services to the natural gasoline and condensate industries.

Author of nearly eighty scientific articles on the physical properties of hydrocarbons, a large part of Dr. Lacey's work has dealt with original researches in hydrocarbon phase equilibria and the application of such data to reservoir mechanics.

Due to Dr. Lacey's inability to attend N.G.A.A.'s annual spring meeting at Dallas, arrangements were made to have the presentation made locally through the California Natural Gasoline Association.

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## Lorraine and APCO Merger

The merger of the Lorraine Corporation and the APCO Manufacturing Company into Lorraine, Inc., has been announced by David G.

**David G. Lorraine**

Lorraine, president of the new organization. Mr. Lorraine, a veteran of the oil tool industry and one of its outstanding engineers, has played an integral part in the development of its present high standards. Several revolutionary advances can be attributed to Mr. Lorraine such as the Oil and Gas Separator which has been standard equipment since its initial development in 1921. He also designed one of the first models of the Hydraulic Relief Valve, now used throughout the world. The Adjustable Flow Bean, the Flow Throat Valve, the Three Way Valve, and the Switch Control are some of his other contributions to the Oil Specialties field. All of these products are being manufactured at the Lorraine Inc. plant at 11510 South Alameda St., Los Angeles, which, with the recent addition of the modern facilities of the APCO Corporation, is one of the best equipped factories in the Oil Tool Industry.

## Guttero and Miller Advanced by Western Gear

Western Gear Works announces the recent advancement of Lee A. Guttero and Eugene Miller to handle the sales and service of their PACIFIC PUMPING UNITS, PACIFIC-WESTERN SPEED REDUCERS and other Oil Field

Lee A. Guttero

Equipment. Both men have been with Western Gear for several years and will expand the company's service to the petroleum industry on all matters pertaining to oil field equipment. Lee Guttero serves the Los Angeles and Southern Basin area, and Eugene Miller the San Joaquin and coastal areas.

Eugene Miller

## Vernon H. Anderson Joins Medearis

Paul A. Medearis announces the appointment of Mr. Vernon H. Anderson, as Sales Engineer for the Medearis Oilwell Supply Company, covering the down town trade, and Los Angeles Basin area.

Mr. Anderson started in the Supply business with Republic Supply Company at their Long Beach Branch in 1934, leaving in 1936 to become Sales Representative for Tunnell, Wood & Neilan Company in Kettleman Hills, Bakersfield and Wilmington. At the outbreak of the war, Mr. Anderson affiliated with the firm of Western Pipe & Steel Company as Engineer in the Shipbuilding Division, heading the Material Take Off Division for the Company's Destroyer Escort and L.S.T. program. He returned to the Oil Industry in 1944 as the Los Angeles representative of the Associated Piping & Engineering Company.

Vernon H. Anderson

In his present capacity as Sales Engineer with the Medearis Oilwell Supply Company, Mr. Anderson will sell and supervise the steel fabricated division, which includes the manufacture of flooded suction tanks, unitized generator and tool houses, oilfield sub-scructures, mud tanks, and various other items in connection therewith, which have recently been added to the Medearis line.

## Jackson Made Lane-Wells Petroleum Engineer

Warren J. Jackson, for the past five years representing Lane-Wells Company in the Dallas-Fort Worth area in the capacity of Division Sales Engineer, has been made Petroleum Engineer, according to an announcement by Jas. D. Hughes, Lane-Wells

Warren J. Jackson

Sales Manager. Jackson will continue to make Dallas his headquarters and will devote his time to the solution of petroleum engineering problems connected with Lane-Wells services and products. In this new capacity he will work closely with oil company personnel in developing data which can be used to secure maximum results from the application of Lane-Wells services and products.

## Smith-Emery Expands

Smith-Emery Company and R. A. Perez Co., Assayers, Chemists and Engineers announce the consolidation of their laboratories. The R. A. Perez Co. is giving up its present location, so that all work will be done at the present address of Smith-Emery Company, 920 Santee Street, Los Angeles. All of the staff of the R. A. Perez Co. laboratories including Mr. Otto Ellerman are joining the Smith-Emery Company staff.

As previously announced, the John Herman Laboratories are being consolidated with the Smith-Emery Company. This brings together three of the oldest commercial testing laboratories in the Southwest and will provide increased facilities for executing technical laboratory services.

## Washington Highlights

*(Continued from Page 1)*

monopoly should not be watered down in a way that would place the administration of public property at the mercy of a few operators who, interested primarily in their own gain, may have it in their power to deprive other operators of a fair participation in the resources available for development."

Krug told the committee that he was going to confine his discussion to six major provisions which "seem to me to be of outstanding importance."

First, he said, the provision for transferring the mineral leasing rights from lands under the control of the Department of Agriculture to Interior "is a move in the right direction but it doesn't go far enough." He urged that this provision be broadened to extend this to all lands held by any agency of the government and that Congress provide an overall integrated program for the development of all minerals, including gas and oil, owned by the United States.

Second, he continued, the provision for the limitation of geophysical and geological prospecting to 100,000 acres in any one state should be cut to 64,000 acres.

Third, he opposed the amendment which would grant a maximum preferential royalty of 12½ per cent to a discoverer of a new oil field or deposit.

Fourth, the provision in the bill to enlarge the maximum area that can be held under lease within a single state, to eliminate the restriction upon the maximum area that can be held on a single geological structure, and to remove the acreage limitations from lands leased by competitive bidding, would "create a serious danger of monoply."

Fifth, he opposed the provision to abolish the rght of the Secretary of the Interior to fix the value of oil for royalty purposes. In most cases, he said, the oil produced from any field is sold in a competitive market. In some cases, however, the oil is sold to a single purchaser who could "and sometimes does" fix an arbitrary price resulting in loss of revenue to the government.

Sixth, Krug opposed the provision of the bill restricting competitive bidding for leases to lands within the known geological structures of producing oil and gas fields. This would prevent the government from realizing a revenue from many areas which are reasonably believed to contain oil and gas but which have not been proved to be productive, he said.

W. H. Ferguson, of Denver, Executive Vice-President of the Continental Oil Co., and formerly public lands expert for the Petroleum Industry War Council, told the committee that the industry would not object to the removal of the jurisdiction of lands now under Agriculture to Interior, pending Congressional action on the entire public lands problem.

He urged the adoption of the provision making the royalty payable to the United States on all new leases and on all new deposits under existing leases discovered after May 27, 1941 to a flat 12½ per cent of the amount of value of production, instead of the present set-up scale which can run as high as 25 per cent.


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Ferguson also objected to the acreage limitation proposed by Krug, partially on the grounds of the administrative difficulties which would be encountered and urged the Congress specifically to legalize the practice of taking options for a maximum of two years for the purpose of doing geological and geophysical work.

With respect to the provision requiring the Secretary to approve all assignments of leases, he asked that this be changed to a provision that the assignment of any lease should be presumed to be approved when filed, subject to disapproval only for lack of qualifications of the assignee, within six months after filing.

Ferguson charged that during the entire war the Federal government has done nothing to promote or encourage the development of oil and gas on the public lands, has instead deterred rather than encouraged development, and has grown "increasingly academic and legalistic about all sorts of minor matters."

Declaring that the Interior bill suggests that additional wide discretionary powers be committed to the Secretary, he said that any amendatory legislation should reduce, so far as possible, the number of matters left to the discretion of the Secretary.

More than a dozen other witnesses, mainly from the Rocky Mountain Oil and Gas Association, echoed Ferguson's words, urging adoption of the Hatch-O'Mahoney bill without the damaging Interior Department amendments.

A. C. Mattei, President of the Honolulu Oil Corporation, summarized the major amendments to the leasing act which the industry wants to have contained in the new bill, as follows:

1. Fix the Federal royalty at 12½ per cent.

2. Enlarge the acreage limitations from 7,680 to 15,360 in any one state.

3. Exempt from acreage limitation leases obtained on competitive bidding, leases that have been in production for five years, and leases subject to plans for unit or cooperative development.

4. Permit an operator to take geological or geophysical options from government leasees or applicants for two years, without any assignment as to area.

5. Permit the assignment of any lease to any qualified applicant, such lease to be presumed to have been approved unless specifically disapproved by the Secretary of the Interior within six months of filing on the grounds that the applicant is unqualified.

6. Authorize the Secretary to delegate to any state agency or other person or committee, control over production and development under plans for unit or cooperative development.

7. Permit drilling of wildcat wells by two or more tenants in common of a government lease without being penalized by excessive acreage charges.

8. Restrict competitive bidding to


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lands within known geological structures of producing oil or gas fields rather than permitting the Secretary to release for bidding lands merely believed to be valuable for oil or gas development.

9. Make a number of relatively minor amendments to present administrative procedures.

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Announcement of the organization and personnel of the new petroleum industry committee, requested by President Truman a few weeks ago, is awaiting action on the part of the Department of Justice. Secretary Krug has requested an opinion of the Attorney General with respect to how closely the group may operate and in what manner before any announcement will be made. The Justice Department decision has been drafted and is now undergoing review before it finally will be sent back to Krug.

While Ralph K. Davies, former vice-president of Standard of California, and wartime Deputy Director of the Petroleum Administration for War, now engaged in helping set up the committee, has made up a list of men he would like to have in the group, he will not formally ask them to sit on it until he receives an official opinion on what activities it may engage in without running foul of the Antitrust laws. Incidentally, memories of the Madison cases of a few years back are still too vivid for any oil man to accept a place on the council without being assured in advance that there will be no possibility of Federal indictments for doing something he was told to do by the Federal government.

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## So. Calif. Meter Association Schedules Annual Low Jinks

The June Meeting of the So. Calif. Meter Association will be held Thursday, June 20th at the Rio Hondo Country Club, Downey, California.

The June meeting will be devoted exclusively to a real time at the Annual Low Jinks. Dinner will be at 6:30 and the show will start at 8 o'clock. All members and friends are invited to attend.


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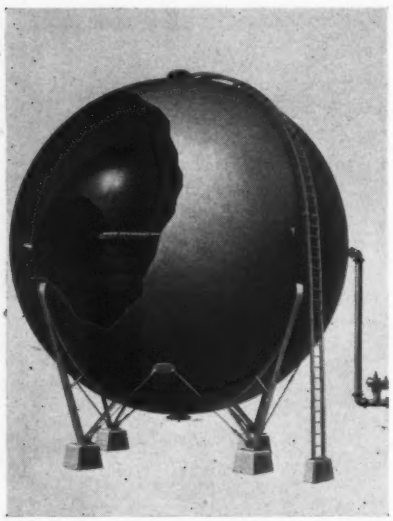
## First Vaporsphere Installed At Mobile, Alabama

The first Vaporsphere for reducing evaporation losses from flat-bottom tanks storing volatile liquids has been installed at the Hempstead Oil and Storage Company at Mobile, Alabama. This spherical structure, which prevents loss by providing temporary storage for vapor displaced by breathing, was designed by the Chicago Bridge & Iron Company, Chicago, Illinois.



**Cutaway view of a Vaporsphere showing the flexible membrane connected to the shell at the equator.**

The Vaporsphere at the Hempstead Oil and Storage Company has a capacity of 5,000 cu. ft. and is connected to the vapor spaces of two flat-bottom tanks storing motor gasoline by 6 in. diameter light-weight vapor lines forming an effective vapor saving system. When increasing temperatures cause expansion in the tanks the excess vapor flows through the vapor lines into the the Vaporsphere where it is stored temporarily. When conditions causing its displacement have changed, the vapor returns to the tanks.

Vaporspheres are also used to prevent filling losses from pressure tanks by designing them to operate at the same pressure as the tanks and equipping the air space with a pressure regulator.

The Vaporsphere consists primarily of a spherical steel shell with a flexible hemispherical membrane on the inside. It is connected to the shell at the equator. Vapor is stored beneath the membrane and the space above is filled with air at all times. The Vaporsphere is supported by four structural cradles resting on individual concrete piers.

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## Wire Line Data

An informative pocket-sized book on "Selection and Maintenance of Wire Lines for the Oil Country" has just been published by the American Cable Division of American Chain & Cable Company, Inc. Wire lines are used on so many operations in the petroleum industry that the information contained in this book should be of value to many men in field and offices. It may be obtained by addressing the company at Bridgeport, Connecticut.

After discussing the selection of wire lines, the construction of various designs are described and illustrated with cross sectional views of the different types. In a section on inspecting of equipment to prevent needless wear on wire lines, there are presented data on lining up the sheaves, alignment of head sheaves and drum, checking diameter of sheaves and drum, and other pertinent information including a table for calculating correct groove diameters.

Under maintenance are given data on equipment for use in inspecting wire lines, on checking for corrosion and abrasion, nicking and scarfing and on reduction of wire rope costs, including instructions on restoring grooves to proper condition. After discussing lubrication, miscellaneous information such as how to determine drum capacity, calculate rope remaining on a reel, effects of socketing on strength and life of line and cutting of wire rope is given. The book is widely illustrated with field shots as well as photographs and drawings depicting operational details.

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## Helium Production

U. S. Bureau of Mines plants in the last five years produced 370,787,000 cubic feet of helium. This quantity is enough to inflate more than 600 large patrol lighter-than-air craft. A little more than 25 years ago helium cost $2,500 per cubic foot, but during World War II the cost was less than 1 cent per cubic foot. The three major helium plants in the U. S. are located at Amarillo, Texas; Excell, Texas; and Otis, Kansas.

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## Soluble Plugs or Go-Devils Developed for Removal of Paraffin from Lead Lines

Pushing paraffin out of production pipe with a go-devil is an old oil country custom which has lately been simplified by the development of an oil soluble plug. This new plug does away with the need of retrieving or disposing of the go-devil and simplifies the practice of one of periodic injection.

Simple connections at wellheads allow the insertion of a plug in the lease line through which it can be impelled by a pressure fluid. The plug and paraffin are generally pumped into the lease tank where the plug dissolves.

Another application is for the cleaning of well tubing in flowing wells where a soluble plug may be forced down the tubing against the well pressure. Upon reaching the bottom of the hole, the plug and paraffin melt under the higher bottom hole temperatures and may be produced as a liquid upon return of the well to its flowing condition.

These plugs are compounded strong enough to clean out the wax, yet sufficiently flexible to pass through ordinary bull plug pipe fittings. Being soluble, they dissolve after a few hours submergence in crude oil. They are commonly available in sizes 1" to 3", while other sizes can be obtained easily as needed.

## New Fast Improved Pac. Coast Service Announced by Union Pacific

A new fast, non-extra-fare, transcontinental train and a slash of other train schedules between Chicago and the Pacific Coast of from one to 18-2/3 hours, will become effective on June 2, according to an announcement by C. J. Collins, general passenger traffic of the Union Pacific Railroad.

The new train, appropriately named "The Transcontinental", to be operated jointly by the Union Pacific and Chicago and North Western Railroads, will handle through Pullman sleeping cars from New York and Washington, destined to Los Angeles, with a minimum layover in Chicago. In addition the train will also have day coaches, in which all seats will be reserved, from Chicago to Los Angeles.

Eastern seaboard passengers whose sleeping cars are attached to "The General" of the Pennsylvania Railroad and the "Commodore Vanderbilt" of the New York Central, both from New York City, and the Pennsylvania's "Liberty Limited" from Washington, will save one night of travel enroute to Los Angeles.

The new train will leave Chicago daily at 11 a.m., 2 1/2 hours after the arrival of the through cars from the east. Between Chicago and Los Angeles the running time of "the Transcontinental" will be 49 1/4 hours.

"Although 'The Transcontinental' will be one of the fastest first class trains in the United States, no extra fare will be charged," said Mr. Collins.

Eastbound "The Transcontinental" will leave Los Angeles with cars for New York and Washington daily at 10 a.m. At Chicago the connecting trains will be "The General" and "Liberty Limited" of the Pennsylvania for New York and Washington respectively, and the "Commodore Vanderbilt" of the New York Central for New York City.

The new "Transcontinental" is but one of numerous schedule reductions which are announced by the Union Pacific Railroad, effective June 2, which will lower operating time of various trains between Chicago — St. Louis and the Pacific Coast from one to 18-2/3 hours.

The running time of the streamliners "City of Los Angeles" and "City of San Francisco" will be reduced two hours, becoming 39-¾ hours which is the same as the prewar schedule.

The streamliner "City of Denver" will return to its 16 hour overnight every night schedule between Chicago and Denver, one hour less than during wartime.

The new streamliner "City of St. Louis," which will be operated by the Union Pacific and Wabash Railroads, jointly, beginning June 2, will by its transfer of through Pullman sleeping cars at Cheyenne to the "Los Angeles Limited", the "Overland Limited" and the "Portland Rose", reduce the running time between St. Louis and Los Angeles by 17-¾ hours; between St. Louis and San Francisco by 18-2/3 hours; and between St. Louis and Portland by 14-1/6 hours. Coach passengers on the "City of St. Louis" will have reserved seats. There will be no extra fare on the "City of St. Louis".

On the new schedules the "Los Angeles Limited" and the "San Francisco Overland Limited" will leave Chicago at 3:00 p.m. daily, reducing the running time to Los Angeles and San Francisco to slightly over 49 hours, a saving of 13 hours to Los Angeles and 13 hours and 45 minutes to San Francisco. Both of these trains will have reserved seat coaches.

At Cheyenne, Wyo., there will be attached to the "Los Angeles Limited" and the "Overland Limited" through sleeping cars for Los Angeles and San Francisco from the streamliner "City of St. Louis" which will begin operation June 2 from St. Louis via Kansas City and Denver.

Westbound from Chicago the "Pacific Limited," beginning June 2, will depart at 9:15 p.m. and operate on schedules arriving at Portland in 59 1/4 hours, a saving over present schedules of 11 1/4 hours; at Los Angeles in 59¾ hours, a saving of 11¾ hours; and at San Francisco in 60 hours and 35 minutes, a saving of 10 1/4 hours.

Through Pullman cars from Washington, destined for San Francisco, from the Pennsylvania's "Golden Arrow" and the Baltimore and Ohio's fast train "the Shenandoah" will also be attached to the "Pacific Limited".

The streamliner "City of Portland" will make its run to the Pacific Coast in 39¾ hours, 2 hours less than at present, without extra fare.

The "Portland Rose", which is combined with the "Los Angeles Limited" from Chicago to Green River, Wyo., will make its run to Portland in 51 hours and 50 minutes, a saving of 9-1/3 hours. This train also includes coaches with reserved seats.

The famous "Challengers" with their special cars for women only and other innovations in coach train service which were inaugurated by the Union Pacific Railroad, will leave Chicago every day for Los Angeles at 9:45 p.m. and for San Francisco at 10 p.m., operating on a schedule of 4 hours and 35 minutes and 3 hours and 45 minutes less, respectively, than heretofore. The "Portland Challenger" will leave Chicago at 9:15 p.m. and will reach Portland 1¾ hours faster than the present schedule.

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## Hydrofluoric Acid Alkylation

Since the first commercial hydrofluoric acid alkylation plant went on stream on Christmas Day, 1942, at the Borger refinery of the Phillips Pet. Co. a vast amount of engineering data has been accumulated concerning the process which should be put under one cover and in a style for practical use.

This has been accomplished by the recent publication of **Hydrofluoric Acid Alkylation** (Phillips Pet. Co.—1st Ed.—336 pp—95 ill.—$7.50). The twelve well illustrated chapters are divided into the chemistry of HF alkylation; design of HF alkylation units; operation of HF alkylation units; correlation of operating variables; test operations with thermal feeds; continuous plant alkylation of isobutane with mixed butylenes, amylenes and propylene; analytical methods; safe practices; properties of HF; metallurgy and corrosion problems; operation of the Champlin alkylation unit; the alkylation of catalytic isobutylene-butylene copolymer; and a comprehensive appendix and index.

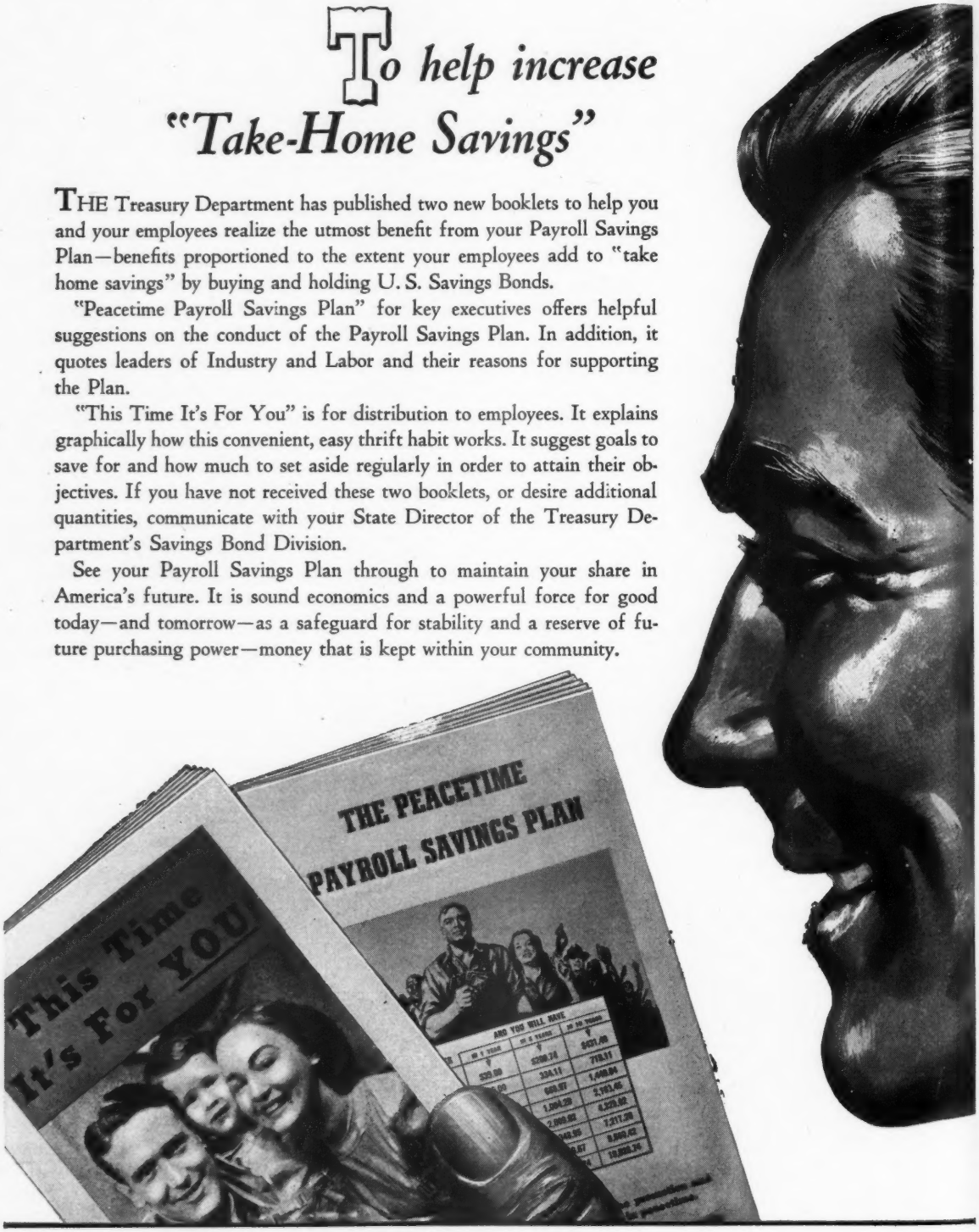
# To help increase "Take-Home Savings"

THE Treasury Department has published two new booklets to help you and your employees realize the utmost benefit from your Payroll Savings Plan—benefits proportioned to the extent your employees add to "take home savings" by buying and holding U. S. Savings Bonds.

"Peacetime Payroll Savings Plan" for key executives offers helpful suggestions on the conduct of the Payroll Savings Plan. In addition, it quotes leaders of Industry and Labor and their reasons for supporting the Plan.

"This Time It's For You" is for distribution to employees. It explains graphically how this convenient, easy thrift habit works. It suggest goals to save for and how much to set aside regularly in order to attain their objectives. If you have not received these two booklets, or desire additional quantities, communicate with your State Director of the Treasury Department's Savings Bond Division.

See your Payroll Savings Plan through to maintain your share in America's future. It is sound economics and a powerful force for good today—and tomorrow—as a safeguard for stability and a reserve of future purchasing power—money that is kept within your community.

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